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THE FARMER'S DIGEST

FORT ATKINSON, WIS

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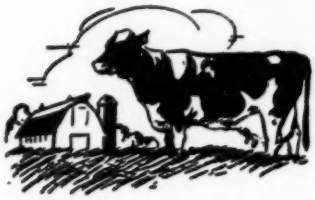
The **Farmer's Digest**

Volume 20 August-September 1956 Number 3

Dairy Farming of Tomorrow



Minnesota's famous Dr. Petersen tells how we will quadruple the amount of milk per man hour of labor . . .

Condensed from Certified Milk

Dr. R. E. Petersen,
University of Minnesota

DAIRYING is in for the greatest revolutionary change in its entire history. The objective is an enormous increase in efficiency—the measure of which is to be the pounds of milk per acre and pounds of milk per man-hour.

We have the knowledge that will enable us, on the average, to double the milk produced per acre and increase by four times the amount of milk produced per man-hour. In addition to this increase in efficiency we shall give more attention to making the job more attractive to the worker and we shall raise some serious questions about control measures now enforced as to whether or not they contribute or hinder furnishing consumers with the best quality product.

To attain these objectives we must have better cows, make greater use of roughage, mechanize the dairy farm, and above all have an open mind toward new developments.

Better Cows

Better producing cows is a first "must" in improving the efficiency of the dairy farm. Most of the cows on dairy farms today are not good enough for the dairy farm of tomorrow. It has been abundantly demonstrated that a herd of cows averaging 400 pounds of butterfat, or 10,000 pounds of milk, can be obtained and maintained. Such production can be gotten on twice daily

Reprinted by permission from Certified Milk, 405 Lexington Ave., New York 17

milking and for a 10-month lactation period under ordinary sensible conditions. Artificial insemination societies have bulls that will sire that kind of daughters.

Not every daughter of a good bull will meet the minimum requirements of production. To obtain a high level of production will necessitate raising nearly all daughters of all cows until they come into production and keeping only those that will make 400 pounds of fat or 10,000 pounds of milk on a mature basis. Inefficient cows cannot be tolerated. By raising the average production of cows to the level just mentioned, we will nearly have attained the doubled production of milk per acre of land.

Dairymen of tomorrow must better know what the cow requires in the way of feed and then learn how to produce that feed. Of all the farm animals, the good dairy cow is by far the most economical and best servant of man. Her product, milk and its byproducts, is the unexcelled human food. It is possible for the cow to make this unexcelled human food from the feed that cannot be used by human beings. Herein lies a lesson that must be learned.

Efficient Digestion

The cow as well as other ruminants is built for the handling of forage; it is not built for the handling of concentrate. The human is constructed for the handling of concentrate — not forage. Thus, the cow serves in a way unequaled by any other animal in converting forage that is not usable as a food by man into the most digestible and usable of all foods—milk.

The basis for the cow's efficient handling of forage is due to the fact that she can digest cellulose efficiently. Man cannot digest cellulose as there are no digestive juices secreted that will b r e a k down this substance. Neither does the cow secrete digestive juices that will break down cellulose but because of her rumen, the myriads of bacteria therein break down cellulose into fatty acids that are subsequently absorbed and used for the making of milk as well as performing other body functions. The acids resulting from the breakdown of the cellulose are chiefly acetic, proponic, and butyric. For the ruminant, these acids are essential for its well-being.

There are, of course, a number of different forms of cellulose, some of which are more usable than others. Cotton is a good example of one kind of cellulose. It is nearly pure cellulose. Human beings are unable to digest cotton. For the ruminant, however, it has been shown that cotton fibre may be as much as 92

per cent digestible or one of the most digestible of all substances that could be fed.

When we realize that cellulose is one of the most plentiful of all plant constituents on the farm, that this substance is not usable by human beings, and that it is one of the most digestible of all food constituents that can be fed the cow, we become fully aware of what an important function the cow can play in serving mankind.

Cellulose is a characterizing constituent of all forage. However, all forage is not equally digestible by cattle. As a matter of fact, forage such as wheat straw, corn stover, and the like, may be very poorly utilized. The question here is what is it that characterizes these forages that are so poorly utilized. The answer is that these forages have developed another component that is indigestible or very poorly digestible, and that is known as lignin.

Lignin Content

Lignin, therefore may be designated as the villain in our forage crop, and the problem of the dairy farmer is to keep the lignin content of the forage down to the minimum. When that is done and when the forage provides adequate amounts of protein and mineral, it alone can support the highest production for which a cow has inheritance.

It is not argued here that we should produce our forage with such high quality that we completely dispense with the need of feeding concentrates—which incidentally is done and is necessary in order to make up for the deficiency of the forage that we normally feed—but, rather that we improve the quality of our forages so that with the present level of grain feeding or less, production may be increased by having the milking cows better nourished.

To keep the lignin content down in forages, one must understand, first, why it increases to make most of our forages of such poor quality. It is a characteristic of all plants that their stems and branches have low lignin contents when these plants are young and succulent, but as they grow toward maturity the lignin content increases until, in the case of mature plants, it becomes such a high proportion of the total composition of the plant that the digestibility of the plant is enormously reduced. Therefore, the real problem in making better forage is to get it harvested or grazed at the time when the lignin content is low.

Reports from Cornell University show that every time that lignin increased, the digestibility of all other constituents of the forage decreased.

Using Forage

How good can forage be from a digestibility standpoint? There are quite a sizable number of experiments to indicate that very young forage is nearly as digestible as the highest valued grains or concentrates. For example, just recently in Georgia some work was carried out on the digestibility of winter grains and grass in which it was found that as much as 77 per cent of the dry matter was digestible — a fact that puts it in the class of a fairly good concentrate mixture to feed our cows.

Further evidence as to what may be obtained from forage only comes from New Zealand, where producers have learned how to handle forage and make the greatest use of it. In New Zealand I have seen a cow, milked twice a day, and for only 286 days, produce 848 pounds of fat on nothing but grass and hay. The herd of which she was a member averaged 540 pounds of fat per cow, on the same type of feeding.

The secret of such a high production is this. Each day, those cows were put on a fresh lot of rapidly growing but very young mixtures of rye-grass and clovers. The stand was such that the cows filled up completely in a short time. It was so palatable that they ate adequate amounts. The hay was harvested when it was young so that it, too, was low in lignin content and high in digestibility.

We, too, can get similar results from similar handling of our pastures. At the experiment station at the University of Minnesota, rotational grazing in which the cows were pastured in a fresh strip of alfalfa, brome-grass, or similar material, each day, produced results comparable with those obtained by the New Zealanders.

Milk Production

We now come to the problem of increasing the amount of milk produced per man-hour. Of course, when we double the production per cow and leave other management factors as they are, we could very nearly expect a doubling of the output of milk per man-hour. However, we have much more to be gained by recognizing a few fundamentals required in adequately housing and managing a dairy herd.

The first of these is the recognition of what is the housing need of the dairy cow. Here, experiments within the past 25 years have shown that the dairy cow does not need a warm barn. As a matter of fact, a good deal of evidence points toward her preferring a colder barn than is normally furnished. It appears at this time that what the cow wants is a dry bed, preferably a warm

bed and protection against the direct drafts. It has been shown by a number of experiment stations that a shed having a tight roof and protection on three sides—preferably east, north, and west—and open to the south will furnish adequate housing protection. This is especially true when the litter is permitted to accumulate by using bedding so as to maintain a dry bed and in which a temperature up to 95° F. develops to furnish that warm bed which cows will choose if they have the opportunity.

This set-up naturally reduces the cost of housing per cow but a more important gain is that it offers opportunities to mechanize the feeding and general care needed for milking cows. Under this system we can come to treat the herd as a unit rather than as individual cows. We can eliminate the daily barn cleaning by letting the litter accumulate. We can clean it out just once a year and incidentally by so doing, we preserve much better than has been the custom, the fertilizing value of the manure.

Mass Feeding

When the cows are housed and treated as a unit, the practice offers an opportunity for mass feeding of hay and silage. It will be possible to set up structures for the feeding of hay which will be semi-self feeding. We have experience with two of these structures consisting simply of poles set into the ground and the cheapest of metal roofs put over the top. When chopped hay is used, a few minutes a day is all the time that is required for feeding a hundred head of cattle all the hay they need. Another advantage is that hay will be available all hours of the day to all animals.

In a similar way, silage feeding can be mechanized either by the use of bunker or trench silos from which the cows may be self-fed, or the conventional silo in which an unloader is used and the silage unloaded into portable bunks that may be moved into suitable places for the cows to help themselves.

But more important from the standpoint of mechanizing the dairy farm is the opportunity of greatly improving the labor requirement and the desirability of doing the milking job. By the use of elevated stalls, carry-away pipeline milking machines, and bulk tanks in the milk room, a good man can operate three sets of teat cups and with normal milking cows, milk 35 cows an hour; and at the same time, with sensible grain-feeding facilities, can feed the cows their concentrates. It is even possible that in the near future there will be developed meters that will accurately weigh or measure the

milk as it comes from each cow, and record it, thus eliminating the use of buckets from which milk is now weighed. If we select cows for milking with fast machines, or better yet, breed them for this characteristic which is possible as we have evidence that the milking characteristics are inherited equally from the sire and the dam, one man could milk 50 of them in an hour.

The milking parlor, with carry-away pipeline and bulk storage of the milk, which is rapidly coming into use in many dairying areas, also offers an opportunity for sanitizing the equipment with ease and with far more satisfaction than has been the case in the past. There are already well developed systems by which the cleaning and sanitizing of this milking system can be done automatically, and further improvement along this line can be expected.

Mechanized Farming

With these developments in, and attitudes toward, the dairy herd, you can see that it is not far fetched to say that a good man can milk and feed, hay, silage, and grain to 100 cows daily in less than 8 man-hours.

It is also obvious that mechanizing dairy farming will remove the back-breaking work, as it is conceivable that the fork and the shovel can be eliminated as well as the can brush in the milk room, and that most of the hard work can be done by machinery.

One other thing which is new and which will improve the attractiveness of dairy farm work should be mentioned. By using identical twins, at the University of Minnesota, we have shown, at least for those animals that milk up to 10,000 pounds on a twice-a-day milking for 360 days, that by lengthening the interval between the evening and morning milking to 14 hours and shortening the interval during the day from 12 to 10 hours, no effect was observed upon production. The average quantity of milk per hour for these cows during the 14-hour interval was lower than that for the 12-hour interval, but the average hourly quantity for the 10-hour interval was increased sufficiently so that total production was not affected.

Other Problems

In dairying for tomorrow there are other important considerations. Of the many that could be listed, one is herd health. Disease of various kinds inflict enormous tolls, and prevention of these diseases and their prompt and adequate control should they appear are imperative. In dairying for tomorrow, I think that the veterinarian is going to play a much more important part than he has in the past.

Most Beef Per Acre

This Indiana farmer has made an outstanding success in raising beef on grass . . .

Condensed from Successful Farming

Oscar Ackerson

WALTER BREYFOGLE, Crown Point, Indiana, has had phenomenal success making beef from grass. His one 20-acre pasture has carried as high as 180 head of cattle during the four seasons he's pastured it.

Breyfogle seeded the level, dark-colored silt loam field to wheat in 1950. In the spring of 1951 he seeded alfalfa, orchard grass, Ladino clover, and birdsfoot trefoil in the wheat. He got a good stand of everything except the orchard grass, which came through with about an 80-per cent stand.

Breyfogle fenced the 20 acres into three triangular areas of approximately equal acreage.

The last of April, 1953, 180 head of Montana Herefords were turned on one of the triangular pastures. The cattle were rotated from one area to another every 10 days to 2 weeks.

On July 22, 1953, 62 head of the larger cattle were moved to the barn for finishing on ground ear corn and ground cobs. One hundred and eighteen head grazed until August 10, 1953, when 42 head were removed for fattening. The remaining 76 head of cattle remained on the pasture until November 1, 1953.

This means that 180 head of cattle grazed the 20 acres for 82 days, 118 head grazed it for 19 days, and 76 head grazed it for another 71 days.

In 1954, Breyfogle turned 115 head of Hereford heifers, weighing an average of 475 pounds, on this pasture the second week in May. These cattle were fed no grain until the last week in June, when they were fed 3 pounds of ground ear corn per animal daily. They were not fed any protein supplement. The cattle remained on this pasture until October 1, 1954.

These cattle were not weighed, but assuming they gained 1 pound daily, this pasture pro-

Reprinted by permission from Successful Farming, Des Moines, Iowa

duced 16,790 pounds of beef in 1954, or an average of 839.5 pounds of beef per acre.

It is believed that the daily gains were considerably higher than 1 pound daily, but even at this conservative figure, Breyfogle produced a lot of beef from grass.

In 1955, a dry year, Breyfogle turned in 160 head the first of May. On June 6 he took out 50 head and left the remaining 110 on till the last of October. During the season Breyfogle figured he fed the cattle on pasture $2,932 worth of roughage and feed. They gained a total of 32,274 pounds, so if you figure the cattle worth 21 cents a pound, that's a net of $3,845 after feed costs. Much of this could be credited to the pasture.

What made this pasture so productive?

1. Generally speaking, the rainfall was ample during both 1953 and 1954.

2. The silt loam soil was heavy enough to hold moisture and fertility. The pasture was not irrigated.

3. The pasture was manured each winter, and also in the summer of 1954.

The applied manure and also the droppings appeared to dissolve into the soil following rains, since manure was not evident on the surface of the soil for any length of time. The pasture was not dragged or harrowed.

4. The seeding mixture was of a type to produce large amounts of forage. The alfalfa and the orchard grass supplied most of the forage. It is believed that the alfalfa held up well because it was rotation grazed.

Breyfogle said, "The orchard grass grows vigorously, and recovers quickly from grazing. It also seems to green up quicker than other grasses in the fall."

Give Hens Plenty of Water

Hens need a great amount of water to drink. Regardless of the type waterer—automatic fountains, buckets or whatever—every 100 hens should have available at all times 8 gallons of fresh, clean water. Two good waterers can handle 100 laying hens. Waterers raised from the floor level, but easily available, can help prevent filth in the water and dampness around the waterer on the ground and in the litter. To keep the hens eating feed so that they will keep laying eggs, give them plenty of water. —*Louisiana Extension*

Six Sows — Six Tons of Pork

A formula for making money with hogs . . .

Condensed from Breeder's Gazette

Frank A. Smith

YOU CAN raise 60 pigs from 6 sows and put 6 tons of pork on the market in 5 months. Not as simple as it sounds, but it's the answer to the hog raising problem today.

Let's take a look at ways and means: There are five main cost factors in raising pork: (1) feed, (2) labor, (3) number of pigs marketed per litter, (4) equipment, (5) land. And four main market price factors: breeding, market weight, marketing time, uniformity.

Feed Factor

This is the big one, since four-fifths of your hog raising cost is feed. Studies in Minnesota, Iowa, Illinois and Indiana turned up a need for 1,000 lbs. of feed to produce a 200-lb. hog. You can do better than that.

When hog prices get low, we're tempted to let hogs have all the cheap corn they want and forget protein feeds. That's a quick way to lose our shirts. We get small litters, fatty hogs, work like blazes, and end up with lower market prices and a slimmer pocketbook.

Ever stop to think that you have *two* banks from which to draw cash for hog feed? You have a bank in town and another bank right in your corn crib. If you feed nothing but corn, you draw 12 bushels of cash out of your crib account. You feed about $13 worth of corn to get $12 worth of hog. That's not good economics. But draw only 5 bushels of cash from the crib and enough cash from the bank in town to buy 40 lbs. of supplement and you have less than $8 invested for a $12 market. That makes sense.

A good sow-feeding program will get you a pig for 150 lbs. of feed. A good pig-feeding program will get that pig up to 200 lbs. in 5 months, for another 620 lbs. of feed. That adds up to 770 lbs.—not 1,000 lbs.

You start with the sow, for if you want 10 husky pigs you must feed for them. You can cut your sow feeding costs with custom mixtures, using your own grain. I am not a fan for hand-

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

feeding corn and sow supplement separately. It is my belief that a sow will produce better if she is given a complete mixed ration, including ground corn and many other critical ingredients at a proper level. We have come a long way in hog feeding. Our next new frontier is *embryo pig feed* — scientifically balanced feed that makes the sow a much more efficient pig-producing machine.

In our excitement over pre-starters (and that's justifiable), we may have forgotten the feed which nature created as best for baby pigs — *old-fashioned sow's milk*. It is the best and can be the lowest-cost feed for pigs. For the purpose of producing milk, your brood sow feed formula should be quite different from the bred sow formula. As a boy I saw lots of skim milk fed to sows with litters. Grandpa used to say, "Nothing makes milk like milk!" Today there are excellent dried milk products available for mixing into sow rations. Take advantage of them.

To keep an average of 10 pigs per sow, have one of the new improved synthetic sow milks on hand. It may save pigs in emergencies, when used as a liquid the first week. Pre-starters have proved themselves, especially for large litters. Even the best fed sows cannot make 10 nipples produce at capacity.

After pigs are *6 weeks old* they can be switched to a feeding program which will take them all the way to market—corn, concentrate and mineral. Several feed companies have come up with new "milk blocks" for hogs. They're self-feeders. No labor attached. No slop barrels or troughs. And these blocks may be important in keeping 10 healthy pigs per litter on the march to market.

We are always complaining that our days are few, and acting as though there would be no end to them.
—Seneca

Labor Factor

Hogs cannot be raised without a certain amount of elbow and knee grease—but you can keep work to a minimum. You should be able to produce 60 market hogs on as little as 90 total hours of labor. To accomplish this you will self-feed, grow out hogs close to home and keep them fairly confined. You will have automatic waterers. Your feeding will be done over the fence, not through the gate.

Pigs-Per-Litter Factor

Time was when the break-even point was 5 pigs marketed per litter. At present prices, the break-even is closer to 9 pigs. Your profit will be made from

the 10th pig, and you must raise that 10th pig to make a ton of pork in 5 months.

Equipment Factor

Simple housing is recommended. Doane has a good multiple-house that's very practical. One house will serve as a bred sow shelter. Two houses, faced together and equipped with farrowing stalls, are excellent for farrowing. After weaning, you remove the stalls and set the houses side by side. They'll serve as shelter for the pigs all the way to market.

You'll need one self-feeder for the sows. For creep feeding, there's an excellent new all-metal hover job now on the market which you can buy at considerable savings. It will handle 60 pigs up until they weigh 60 lbs. each. It can be converted easily for inside feeding by removing the hover.

From there on, two 10-holers or one 20-holer compartmentalized *self-feeder* will be enough to dish out corn, supplement and mineral. You'll need an automatic 2-hole *waterer* for sows and two of the same for the growing pigs.

Land Factor

Instead of letting your hogs roam far and wide, confine your enterprise. Four or 5 acres of land should be enough. You'll save steps and put land you don't need to other uses.

Breeding and Market Wt. Factors

Get yourself a long, lean breed of hogs. Sell 'em at 200 lbs. I could give a long "fat" lecture on what fat hogs have done to us. Fat hogs have helped bring low market prices down on our heads. Fat pork can't compete with juicy beef and broilers—but good lean pork looks good to the housewife. Lean pork will save our bacon!

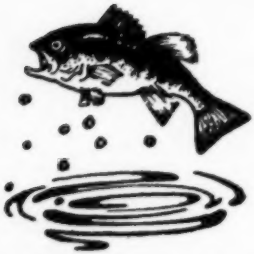
Marketing Time Factor

In December hog prices hit a low of $10. By late January they were back up to a better than $14 top. That's $8 a hog difference. And it's a difference you want to prepare for. At the present time, the two best markets of the year are January and June. Breed to farrow in August, so you can sell in January—in January, so you can sell in June.

Uniformity Factor

There is always a premium which goes to a load of uniformly sized pigs. It is the only way to ever top the market. Uniformity is the result of careful breeding, farrowing litters within a few days of each other, good feeding and expert management.

Six sows! Six tons of pork! Is that goal too difficult? It's a good one to shoot at. If you can produce for even a small profit now, you can really make money on hogs as prices improve.



Cash from Farm Fish Ponds

Trout, bass and bait are a good potential for additional income. Farmers find fish ponds pay off . . .

Condensed from Farm Management

WESTERN FARMERS are watching with interest the development of farm ponds, trout pools and commercial fish hatcheries on marginal farmland.

Most ambitious of a number of commercial enterprises under way is a 206-acre project near Wilton, Calif., where a Missouri firm has purchased a plot of grade B dairyland for commercial growing of gold fish and minnows.

Incorporated as the Sierra Live Bait Co., the firm has scooped out huge ponds and expects to market 40 million live bait minnows annually and a similar number of gold fish.

Many farm managers are looking to the pond idea as a possible new revenue potential in their management program. Long recognized as a desirable conservation development, the farm pond of today is taking on new commercial aspects.

The Missouri firm came west, spokesmen said, because it has been supplying Californians with gold fish and minnows by truck for the past eight years. Operating large hatcheries at Stover, Mo., and also in Arkansas and Tennessee, they decided to install a hatchery operation in the midst of the western market.

Albert J. Fajen, biologist for the firm, says he searched the state for a site with good drainage, cool night temperatures, a clay soil and plenty of water.

The firm expects to have about 50 acres under water this year, at a cost of $75,000, not including the purchase price at $160 per acre. They expect to have a hatch on the market this summer. They will produce flat head and shiner minnows in the pond. They feed once a day, and expect to throw 3,000 pounds of a special formula into the ponds at a time. Its main ingredient is cereals, with a mixture of antibiotics to speed growth and ward off disease.

Duke Crosiar, Hemet valley fruit rancher, fulfilled a long-standing dream several years ago

Reprinted by permission from Farm Management, Los Angeles, California

when he built a trout pond in his apricot orchards. Trout do not thrive in the warm waters of California's inland valleys. Duke had the answer, however, in a cool-running well and a well-planned aeration system.

Not every farmer has the time nor inclination to build up a business costing $6,000. But Duke's hard-won know-how has paid off for him and it provides an excellent guide to problems faced in stocking farm ponds. As Duke points out, trout require a more complicated plant than do other California game fish.

Uncontaminated, cool water is available from a 300-foot well adjoining the Crosiar Ranch. It delivers water of 60 degrees temperature at a cost of $6.50 per acre foot. Plentiful, cheap water is the backbone of any fish farming venture.

Duke's pool is 154 by 75 feet, and 16 feet deep. Ringed with logs, it sports a waterfall—built of cement slabs from an abandoned flume—serving as decoration and as part of the aeration system. Duke used a fresno to dig the first six feet. For the deeper portions, he used a ¾-yard carryall, and finished with a bulldozer.

Though built into a heavy, clay subsoil, seepage necessitated a sealant—about two tons of Bentonite. A like amount of cement was floated with the sealant. Sinking, the mixture effectively sealed the pool bottom until accumulated moss and fish refuse completed the job.

In the ordinary, shallow pool, sealant is plowed into soil at a depth of three to four inches. Where sides are steep or water present, floating is an effective method. About three days were required for the mixture to settle to the bottom. This decreased seepage and controlled undesirable growth to some extent as well.

Duke emphasizes that trout will not reproduce in his set-up. Normally, trout need several years before propagating in a pond. Duke buys fish from a commercial hatchery, stocks his pond, and customers fish them out. He makes his profit on fish and bait sold. His biggest worry has been temperature control and oxygen supply for the some 2,000 fish he stocks.

"At 70 degrees the fish bite. At 74 degrees, they become sluggish. From 75 to 80 degrees, the trout turn belly-up and die," he says.

He points out that these temperatures are relative, for much depends on relative humidity. On a normal, low-humidity day, aeration cools water from 10 to 12 degrees.

Duke theorizes that lack of oxygen more than heat kills fish,

since pool temperatures rarely run as high as air temperatures. Fish crowd into deep, cool spots to escape heat, rapidly using up oxygen. He believes compressed air delivered to the bottom might alleviate the problem.

The waterfall aeration system picks up pool water through a screened intake and a 10-inch line. A 2-inch line has been installed around the pool to recirculate water, and to aerate through four fixed sprinklers.

Pumps delivering water to the pool are equipped with an automatic switch and float. About 30 gallons per minute seep out, thus a controlled 3-inch flow maintains water level.

Growth can be a problem in any pool with limited circulation. Organic growth and larvae —particularly the hellgrammite —provide food for fish. But for Duke, this growth means lost hooks and slow-biting trout. He controls growth in several ways.

A catalyst, commonly used for cleaning sewage pipes, suppresses growth. He also uses a chain, both ends hooked to a timber athwart a boat, which can be adjusted to mow moss at a desired depth.

Though ravenous fish bite well, at times it does become necessary to feed them. Duke uses a commercial dog feed, and he says the trout readily eat the dried product.

Farm For Sale

"For sale, one farm, bottom half located in Buchanan county. Top half somewhere between here and Gulf of Mexico, filling up the Missouri river bed so as to cause more frequent floods when it rains again.

"One empty house, doors and windows missing, lean-to, two rooms and a path. One silted up pond. One leaning barn. Fifty bales mixed hay, mostly tickle grass and giant foxtails.

"Four mineral deficient cows. They are gentle, guaranteed to have rickets and no calves. One quarter mile of fence, buckbrush, sumac and baling wire. One sow and two pigs — will eat anything.

"Seventeen hens used to roosting in treetops. Farm is guaranteed to produce headaches, overdrafts and foreclosures. Other articles too worthless to mention.

"Reason for selling — owner going to work for conservation farmer who has taken care of his soil."—*From an ad in the Buchanan County(Mo.) Farm Bureau News.*

Diazinon, Best Fly Killer Yet?

This new chemical offers great possibilities . . .
Condensed from Eastern States Cooperator

DIAZINON is a new name in the fly-killing field.

During the past several years, *Diazinon* has demonstrated spectacular kill of house flies with long residual action. In both controlled experiments and in actual farm use, it has out-performed any insecticide since the first memorable years with DDT.

This superior fly control excited entomologists right from the start but enthusiasm had to be kept in check pending duplication of results by different investigators and proof that the chemical was safe to use in a practical way on the farm. Late in 1955, *Diazinon* was approved by the USDA for use in dairy barns.

One of the most comprehensive and detailed studies of *Diazinon* as a fly killer was carried out by Dr. E. J. Hansens, entomologist at Rutgers University, who compared *Diazinon,* malathion and several other materials in extensive tests in dairy barns in 1954 and 1955. In these tests, *Diazinon* was by far the best material used as a residual wall spray. One application of a 1% spray gave 12 weeks or more control and single applications of a ½% spray controlled flies for seven to 12 weeks. In one barn, flies landing on the walls were still being killed 14 months after a single spray was applied! This phenomenal, residual effectiveness should, however, be taken as an exception and not the rule.

In addition to these tests at the New Jersey experiment station, other state research and extension workers have reported a minimum of six weeks' control with one *Diazinon* spray. These effective periods may be compared with the two to four weeks' control usually resulting from one application of malathion. The variations in length of effectiveness between tests with *Diazinon* are probably due, in part, to variations in the fly-breeding potential on different farms. An early-season application may extend the control period much longer than an application delayed until the fly popu-

Reprinted by permission from Eastern States Cooperator, Springfield, Mass.

lation becomes large.

Diazinon kills by contact and by fumigation. In the Rutgers project, it was observed that a single barn spray reduced the horn fly population per cow in the pasture very significantly for two months thereafter. This happened even though the animals were not in the barn at the time of spraying and, in fact were in the barn only two or three hours a day during this entire period! Let us hasten to add that these observed results need further corroboration before horn fly control in the pasture with a barnwall spray may be taken for granted. Nevertheless, this observation and additional experiments too detailed and lengthy to review here attest to the potency and multiple mode of action of *Diazinon* against flies.

Short of livestock water? According to agricultural engineers at Purdue University, farmers should investigate the possibility of developing a seep or spring on the farm if water is needed to carry stock through the dry summer months. If there is no spring, consider constructing a pond this fall so that the same problem won't arise next year.

These are some of the more promising things known about this new fly killer. All pesticide chemicals seem to have their drawbacks, and Diazinon is no exception — although these limitations are not serious.

Diazinon is a relatively toxic material, a chemical relative of parathion and malathion and lying somewhere between these two cousins in its toxicity to humans and warm-blooded animals. It should be handled with care, both when preparing the spray and when applying it. Precautions should be taken to avoid excessive or prolonged contact with the spray mist. It is advisable, although not imperative, to wear an approved respirator while spraying and to wash thoroughly and change and launder clothing after exposure.

Animals should be removed from the building before spraying and kept out for four hours afterward until the spray deposit dries. Feed and water should, of course, be protected against contamination with the spray. *Diazinon* should not be used where the spray or spray residue will contact poultry. (Malathion is still the No. 1 choice for poultrymen.) For some reason, poultry is more sensitive to *Diazinon* than are other farm animals. In brief, the label cautions should be followed carefully when using this material.

Beat Temperature Changes for Bigger Livestock Profits

A simple program of good insulation and ventilation for poultry plus planned breeding for dairy cattle is the low cost way to fight summer heat and winter cold . . .

Condensed from Missouri Ruralist

YOU CAN GET a greater yield from your dairy cows and save on feed for your poultry by maintaining the right temperatures for them.

The University of Missouri discovered in a series of tests that dairy cows produce more when temperature is relatively constant.

Holsteins which produce over 9,000 pounds a year or Guernseys which make more than 6,500 pounds will pay for cost of good housing and show a profit —if housed at temperatures of 45 to 50 degrees.

"Climate" can be built into most barns. Follow this 2-step method:

(1) Provide a properly insulated and ventilated barn.

(2) Adjust breeding cycle so most cows are dry during hottest summer months. Many farmers have found this simple program assures extra profits.

The University of Missouri researchers found milk production fell off rapidly when: (a) temperatures were raised to 80 degrees for Holsteins and 85 degrees for Jerseys, or when (b) temperatures dropped to below freezing, and when humidity was raised and temperatures fluctuated widely again.

Optimum temperature range, they found, was 45 to 50 degrees. At 50 degrees, experimental Holsteins produced an average of 49.80 pounds of milk daily, but dropped to 48.74 pounds at 60 degrees. Total of 1.05 pounds per day for each cow may not seem important—but, for a 300-day lactation, it adds up to 315 pounds per cow or about $336 for a 20-cew herd, when you are shipping grade-A milk.

To maintain a productive climate in barns, walls and ceilings must be adequately insulated. Where average winter temperatures are between 20 and 30

Reprinted by permission from Missouri Ruralist, Kansas City, Missouri

degrees, use 2-inch-thick mineral wool blankets in walls and 3-inch-thick mineral wool blankets in ceiling. Where temperatures average between 10 to 20 degrees, use 3-inch-thick insulation in walls, with doors and windows of insulated glass or with storm sash.

A roof of durable asphalt shingles provides weather and fire protection for the building and its contents. White asphalt shingles, or shingles in one of the light pastels, reflect more sunlight than dark colors, help keep barn cooler.

Vapor barrier side of a mineral wool blanket always should be installed so it faces the barn interior. A positive ventilating system should be installed, and this doesn't mean only electrically-run fans. When temperatures drop outdoors, fans immediately must restrict air flow thru barns and, similarly, they must increase air flow as outdoor temperatures rise.

Altho production will not be significantly affected, you can save on feed by keeping poultry houses with a 55- to 65-degree range. The University of Illinois is authority for this, along with the finding that 20 to 22 degrees is critical temperature for hens moving about freely in daytime.

Nebraska Experiment Station tests indicate good production can be maintained, even in poultry houses which are only slightly above freezing, so long as temperatures are uniform.

Whether you advocate a cold or a warm poultry house, you should maintain temperatures so litter will stay dry and no moisture or frost forms on ceilings or walls. Sudden temperature changes can be avoided by using efficiently the little heat which each hen produces.

To get these results, the house should have a bed of gravel under it to provide good drainage. This should be covered with asphalt roll roofing before floor is poured. The building must be tight, too, and have well-insulated walls and ceilings.

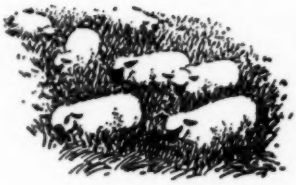
Where temperatures average over 25 degrees, use 2-inch-thick mineral wool blankets in ceiling.

Where temperatures range less than 25 degrees, use 3-inch-thick mineral wool blankets in ceiling. In either case, use sheathing—No. 15 asphalt felt and asbestos board—for walls.

If winter averages are between 10 and 20 degrees, use 2 layers of sheathing on sidewalls. Doors should be insulated and insulated glass is best for windows.

A positive ventilating system also is required. Fan should be of such size and speed it will run continually, and will remove from 1 to 1½ cubic feet of air per minute for each hen in house.

Lambs and Wool, A Dependable Combination



A farm flock of sheep gives this stockman two sources of income . . .

Condensed from Nebraska Farmer

Homer Fine

AS LONG as Curtis Cook stays in farming, there will likely be a sheep flock on his Nebraska farm.

The reasons: he likes working with sheep and lambs. They are a profitable farm enterprise. And they fit in his land improvemest scheme.

Curt's liking for sheep goes back to his boyhood, when at four years of age he was given a job of caring for orphaned lambs. He has been in the sheep business ever since.

He will tell you that, profitwise, you will have to go a long way to beat a farm sheep flock. Income is from two sources—the sale of lambs and the sale of wool.

Curt will admit that some years are better than others; but over the long haul, he figures sheep and lambs show as good or better returns than any other farm animal. He points out that the annual return on every dollar he invests in ewes will range from $1.95 to $2.52.

He says he can't recall ever hearing of a stockman going broke who depended on a sheep flock as his major income.

Curt has fed both western and native lambs. He prefers to keep a flock of about 100 ewes, and breeds to either Suffolk or Hampshire or Shropshire rams.

Last year, Curt figured sheep prices were due for a tumble and provided himself with a "hedge." He sold his flock of farm-raised native ewes and bought old, smooth-mouthed western ewes. The old gals cost him only a fraction of the price his young ewes brought.

He believes that smooth-mouth western ewes — shipped in from Wyoming, Idaho or Utah — can make money on Nebraska farms. The westerns wear their teeth down in from four to five years,

Reprinted by permission from the Nebraska Farmer, Lincoln, Nebraska

depending on the type of feed they get on the range. The big sheep outfits out west send ewes to market at that time, since they want only animals that can winter on the range without trouble.

My country owes me nothing. It gave me, as it gives every boy and girl, a chance. It gave me schooling, independence of action, opportunity for service and honor. In no other land could a boy from a country village, without inheritance or influential friends, look forward with unbounded hope.

—Herbert Hoover

The cornbelt farmer, Curt figures, can buy these smooth-mouthed gals at a price within reason, keep them for a year for the lamb and wool crops, and then send them on to market. Keeping old ewes even for a year, though, takes plenty of sheep savvy.

"But don't try to keep the old gals for more than a year." Curt warns. He tried that — once. At that time, he had a flock of 200 smooth-mouthed western ewes that were in excellent condition. He picked out 100 of the best and sent the other 100 to market.

Curt says more things went wrong with that flock the second year than you would believe. After that, he kept smooth-mouthed western ewes for only one year.

He figures on taking a wool crop from his ewes early in the spring before lambing gets under way. With the wool gone, the old gals look mighty scare-crowish, but he can tell at a glance what condition each ewe is in—whether she is probably carrying only one lamb, twins or triplets.

Also, a ewe that is no longer wearing a warm wool coat will seek the shelter of a shed at night, while an unshorn ewe will often bed down out in the lot. When the lambs have arrived, the ewe that spends the night in a shed has a much better chance of raising a husky lamb, especially on a cold, wet March night.

Back in 1936, he lost seven out of 50 bred ewes. He found that the seven ewes were carrying three lambs each. They had developed pregnancy disease. The disorder develops because of deficiencies in diet. Ewes carrying the most lambs are the first to be affected.

He points out that a bred ewe has a big responsibility. She must eat enough for herself, plus enough for the one, two or three lambs she carries, and also enough to support a heavy pelt of wool.

After that experience, Curt has kept a very close eye on his

flock's condition, and has fed his flock according to the condition of the bred ewes. Consequently, he has had no more trouble with malnutrition.

Curt figures on getting a lamb crop of from 110 to 165 per cent. Lambing normally starts about Christmas, but was deferred to March this year, and that is a busy time.

When a lamb is born, it is moved with the mother ewe to a converted farrowing house. There is plenty of clean, dry corn shucks for bedding, and a big wood-burning stove to provide heat when needed.

Curt believes baby lambs require more attention than do other baby animals. They do a good job of taking care of themselves, though, after they are a couple of days old.

As soon as they are born, Curt marks the lambs and their mother with a number for easy identification. Then, if they get separated, he can get them together again. Another chore Curt does as soon as lambs are born is paint their navels with iodine, as a precaution against infection.

When the lambs are between 24 and 48 hours old, Curt docks their tails and castrates the males. He uses an elastrator for this job. The plier-like device slips a small rubber ring over the parts to be removed. The ring contracts when released and the blood is cut off, causing these parts to waste away and fall off a couple weeks later. Curt has not had a single lamb die of infection or bleeding since he began using the rubber ring method of docking.

Weaning is the easiest chore on the Cook farm. The lambs just stay on the ewes until market day arrives. They are kept in dry lot and creep-fed bran and oats as soon as they will eat. Later on, they get corn, oats, alfalfa hay and mineral.

The last couple of seasons Curt has added dehydrated alfalfa pellets to the creep feed. He thinks the pellets make a fine substitute for green pasture. He also points out that there is no waste when feeding pellets, and they are nice to handle. He purchases pellets during the summer when prices are low and stored in bulk until needed.

Curt usually markets lambs at around 100 pounds. Gains come close to a pound a day. Curt showed lambs to second place in the pen-of-five class at the Omaha Lamb and Wool Congress in 1950. That pen averaged 85 pounds at about 90 days of age.

Curt uses his sheep to harvest soil-building legumes. He plants a mixture of grass and alfalfa or clover, and pastures it only two or three years before plowing that pasture under. He doesn't believe in pasturing too close, and

likes to leave some pasture grow for catching winter snows.

By changing his pastures so often, Curt gets away from most worm problems. However, he does mix phenothiazine with the feed as a control.

Last summer Curt had pasture troubles, like most other Nebraska stockmen. Growth was very slow and carrying capacity low due to dry weather. Another complication arose when the alfalfa in the mixture got so far ahead of the grasses that Curt was afraid he would have bloated sheep on his hands if he pastured as usual. His answer was to bale the pasture and feed it to the ewes in dry lots.

Curt has been using phosphate fertilizer on his legume ground to get increased growth and help the legume's natural soil building along. He likes to apply phosphate and lime in the fall and let the fertilizer have a chance to work into the ground before seeding legumes the following spring.

The grass and legume mixture makes excellent pasture for Curt's ewes during the summer and fall months. Then they go on a feed of corn, oats and alfalfa hay in drylot until after lambing the next spring. He prefers third or fourth cutting alfalfa hay because it makes a greener, more leafy hay than earlier cuttings.

He points out that his smooth-mouthed old western ewes will gain right through the winter when they have plenty of the greenest most leafy alfalfa hay available.

Agronomists at Purdue University report that heavy straw left when large yields of wheat or oats are combined is detrimental to the stand of interseeded alfalfa or clovers. The stubble should be clipped after combining and all straw growth removed to avoid injuring the stand of legumes. Farmers who must leave straw in the field will find that clipping the stubble and then cultipacking the straw residue is the next best method. Where sweet clover is seeded, clipping the stubble may destroy part if not all of the sweet clover, the agronomists caution.

Ordinarily, Nebraska farmers keep a flock of sheep as a sideline to their general farming or other livestock operation. Curt does the reverse. His sheep flock is the mainline operation; a growing herd of Angus heifers is the sideline.

He believes that as long as he has a flock of thrifty sheep on the farm, he won't have to worry about going broke.

Trends in Farm Buildings

An Englishman, writing in an English farm magazine, appraises and compares our newest farm buildings . . .

Condensed from The Agricultural Review

A. J. Langdon, Agricultural Land Service

COMPLACENCY may be a sin, particularly in this restless modern world, but it is one of the least unpleasing of sins. Perhaps therefore it is not so wrong that we in this country (England) can view with some complacency recent trends in farm buildings in America.

In many respects trends in both countries are very similar and, allowing for differences in local conditions, we seem to be as fully advanced in our practices and possibly more advanced in some.

We must, however, acknowledge that this may be due in part to the fairly numerous parties, some official and some unofficial, who have been encouraged, often with financial help, to visit the United States and bring back from there the latest ideas on farm buildings.

The American is even more conscious than the English farmer of the need to save labor, both when working in and around buildings and in the actual construction of the buildings by the farm staff—a much commoner practice in America owing to the extensive use of 'cheap timber'.

The search for labor-saving design is leading to two widely differing types of building. The first is the highly-specialized building, suitable for only one purpose. This can probably be justified on economic grounds only where the enterprise is large, where intensive methods are suitable and where the efficiency of the building results in high profits by which the original cost can be rapidly written off.

The other is the general-purpose building, comprising basically a shell which can be put to a variety of uses, from livestock housing to implement shedding. This type of building is commonly of 'pole' construction. It has a framework of poles treated with preservative, set 3½ to 5 ft. in the ground and clad, on walls and roof, with timber or (to save labor in construction) with steel and aluminum sheets

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in various profiles. Aluminum in the lighter gauges with a felt backing incorporated in it is also being used. Plywood sheets, too, are becoming more common for external walls and floors and many of the difficulties and much of the labor which the farm-builder finds in timber joints have been eliminated by the use of modern timber connections and nailing instead of special joints, bolts and screws.

The same methods of timber jointing are being used in the 'gothic-frame' type of barn or cowhouse, which is a well-known feature of American farm buildings; but laminated rafters, relatively cheaply prefabricated by manufacturers, are used in order to save trouble in construction. The gothic-frame structure, with its lofty headroom, appears to be becoming less popular: to make full and economic use of the space, an upper floor is necessary, and experience in America, as in other countries, is that, on balance, single-story farm buildings are cheaper to build and easier to use.

An alternative to the 'pole' barn is the prefabricated steel hut, which is relatively cheap and is easy for unskilled labor to erect. The best-known example is the 'Quonset' hut, a Nissen-hut type of building which has a semi-circular steel ribbed structure covered in steel sheeting, and which is available in wide spans. This type of building is most suitable for implement housing and shedding.

In buildings for the dairy herd, the loose-housing, or yard-and-parlor, system is gaining favor over the stanchion barn or cowhouse, but it has been widely used only since about 1940. The writer of a recent review of research literature on the merits of the two systems comes down well in favor of loose housing on all counts. With loose housing the recommended arrangement is to provide a covered bedded area of 50-70 sq. ft. per cow with adjoining storage space under the same roof for straw, a paved open yard of 100 sq. ft. per cow and a covered feeding area of 40 sq. ft. sheltered by buildings for hay and silage storage. In milking parlors the stalls are now generally raised above the level of the operator's working space — even in small two-stall tandem and chute parlors which can be fitted into a building no more than 9-12 ft. wide.

Much of the success of a milking parlor depends, of course, on the equipment which it houses, and here the general tendency is towards simplicity and compactness. In this connection it is perhaps worth mentioning the production, by the Hervey Research Development Corporation (England) of a simple but com-

plete milking parlor and milk-room unit which can be installed by the occupier in an existing farmstead and, if necessary, removed elsewhere. It is so well arranged that, as is claimed, an operator can wash, milk and feed thirty cows an hour without moving from his chair in the parlor.

In cowhouses, arrangements for mechanical mucking-out (barn cleaning) are becoming common. The most satisfactory is probably the mechanical scraper attached to a belt, periodically moving along the dung channel or gutter which is narrower and deeper than is normal in England. To give the cows greater comfort, stalls are becoming wider and longer, and there is a special type of 'comfort stall', developed at West Virginia University, with a cross-bar at the rear which can be adjusted to suit the size of the individual cow. With larger stalls it is important that the cow should dung in the channel, and electric 'trainers' are being installed to give the cow a mild shock when she fails to move back to the gutter to dung.

Among developments in the handling of milk are the use of pipeline milkers, with pipes of stainless steel or glass, to carry the milk straight from the cow to the milk room. This indeed has disadvantages, and probably a more important development is the bulk-cooling and storage of milk. Milk from each milking machine is put directly into a large stainless-steel tank in which it is refrigerated, either by direct expansion or by chilled water in an outside covering, and stored. The tanks are emptied every two days by bulk collection tanker. Bulk handling makes for obvious savings—particularly in transport costs—but the initial expense of the necessary farm equipment is high and some reorganization of buildings and roads, to provide access for tankers, is often involved. It is suggested that, in the course of the next ten years, most American farms with more than eight or ten cows will handle milk in this way.

With the development of loose housing for both dairy and beef cattle, self-feeding arrangements for hay and silage are being increasingly used. Where the fodder is in a trench or stack, timber gates are employed and the animal feeds through them; where the stacks are high, horizontal bars above the gates prevent access to a too large face of the fodder. Movable field shelters are also used for self-feeding chopped hay and, in remodeling old barns for the self-feeding of hay, arrangements are now sometimes included for the drying of partially-field-cured hay by fans, which blow cold air through ducts under the material.

Tall tower silos are a tradi-

tional feature of American farms and self-feeding from these is more difficult to arrange; it is, however, possible by such means as having a timber or metal framework, in the form of a cone, at the base of the silo. This supports the silage and enables the animals to eat at it. Trench silos are, however, becoming increasingly popular, self-feeding with them is more easily arranged than with tower silos.

Outdoor systems of pig housing, often with self-feeding shelters, are gaining favor—particularly for breeding and young stock—as being cheaper and easier to manage. In indoor pig housing increasing attention is being given to the provision of a suitable environment, especially through better ventilation and improved insulation of the building structure. It seems that more information is available to the American designer of farm buildings than to his opposite number in Britain about the physiological requirements of pigs and other farm stock; and more importance is attached to meeting these requirements than is usual in Britain.

Plastic Liners for Ponds, Reservoirs

Plastic liners offer "tremendous" possibilities for preventing water storage losses from small reservoirs, Utah State Agricultural College engineers have concluded. Sorensen Brothers of Emery County lined a half-million gallon stockwatering pond in January and were watering their cattle from it in July. Cost for the piece of polyethylene, 120 by 90 feet, was 40 cents a square yard or about $500.

Tests have shown that new plastics such as polyethylene and polyvinyl chloride not only are waterproof but also resistant to rot and corrosion and not easily damaged by mechanical forces. The Sorensens' pond had given trouble for several years. It would empty from seepage two weeks after it was filled. Bentonite and other materials were tried without much success.

The plastic was stretched out over the bottom and sides of the pond. Then the ends were buried in a trench plowed around the top. Engineers say similar linings can be made for earth dugouts or timber frameworks on farms or ranches. They say a 5,000-gallon tank would supply enough water for 100 sheep for 10 days. By completely enclosing the tank, water would be free from contamination and losses from seepage and evaporation would be negligible.

—Utah Extension

Why You Should Inoculate Legumes

New developments make it more important than ever to coat seed with the right bacteria. A new technique uses molasses . . .

Condensed from Crops & Soils

Lewis W. Erdman,
American Research Service

ONE OF nature's best kept secrets is the way in which bacteria are able to capture nitrogen from the air and fix it in the nodules of legume plants. Although the relationship between bacteria and legumes has been known for 70 years, scientists are still puzzling over the matter, trying to find out how it all comes about.

Their searches have not been in vain, though, for over the years much new information of great benefit to farmers has been learned and put into practice. And one of the most important advances has been the inoculation of legume seeds with nitrogen fixing bacteria that are tailored to the particular legume. These bacteria often are present in the soil but seldom in sufficient numbers to give best results.

Inoculation of legume seeds provides the plant with more effective bacteria. Their purpose is to enable the plant to produce greater yields of seeds and forage, build a higher protein content, fix more nitrogen from the air, and—most important—conserve more nitrogen in the soil.

Nitrogen is not only a "must" element in the growth of plants, it is also one of the most expensive, especially when bought in the form of fertilizers. Technologists have made great progress in the manufacture of nitrogen fertilizer but nature, through inoculated legumes, still supplies most of the nitrogen added to soils.

Just how much nitrogen does nature supply? Roughly 80 per cent of the air is nitrogen and there are about 35,000 tons of free nitrogen above each acre of land. But soil microbiologists estimate that the amount of nitrogen fixed from the air by any one legume crop varies from only 40 to 200 pounds an acre each year.

For the nation as a whole, they estimate that in 1950, for example, 4.6 million tons of nitrogen were fixed by bacteria liv-

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ing in nodules of plant roots or more than 100 million acres of legumes. That same year farmers applied only 1.2 million tons of nitrogen fertilizers.

The exact contribution that commercial legume inoculants make in boosting or maintaining this large tonnage of nitrogen fixed in legumes is difficult to determine. Surely they play an important role if we are to judge results from the amount of inoculant sold each year. One encouraging note is that the quality of these cultures is consistently high.

Quality of Inoculants Improving

The New Jersey Agricultural Experiment Station makes yearly tests of inoculants sold in that state. Tests on 70 cultures in 1953 and 1954 showed that the quality of all inoculants was good. The New York Station found only two samples unsatisfactory after testing 85 in the same years. The station reported continuous improvement in the quality of inoculants offered for sale in that state. Indiana found similar results in tests on 134 cultures.

Several years ago a new measuring stick for nitrogen fixation in soybeans was proposed by Sears and Lynch of the University of Illinois. They used two sister strains of soybeans which were developed by L. F. Williams of the U. S. Regional Soybean laboratory. One strain produced an abundance of nodules in the presence of effective soybean bacteria. The other strain did not nodulate.

When the non-nodulating strain was supplied with fertilizer nitrogen, it yielded the same as the nodulating strain. Thus, by carefully controlled experiments the workers were able to measure the amount taken from the soil.

They found that on land low in available nitrogen but with other available nutrients adequate, about two-thirds of the nitrogen came from the air.

Meanwhile, a search for more effective strains of legume bacteria is going on in the Agricultural Research Service of the U. S. Department of Agriculture at Beltsville, Md. There the scientists are not only looking for strains that help our present legume varieties but for strains adapted to new or little known legumes. They believe the lack of proper inoculation may be the deciding factor in the successful introduction of legumes to new environments.

Take Kura clover, for instance. Soil bacteriologists began searching for strains of bacteria which would effectively inoculate this legume more than 10 years ago. Recently, the Beltsville workers isolated several strains that will do the job for Kura. They found

the strains in cultures prepared from Turkish soils sent in by a USDA plant explorer.

Search for Adherents

Now, with effective inoculants for Kura, and as more seed become available, agronomists will be able to study its usefulness as forage and for soil improvement and control of soil erosion.

Still another search is going on. This time it's for a better way to hold the inoculant on the seed —long enough to enable the bacteria to live until the plant gets a start. Water has been used, but Glenn W. Burton of the Research Station at Tifton, Ga. used molasses as an adherent. He found that this treatment on crimson clover gave better yields, especially when the soil remained dry for two or three weeks after planting. If inoculated seed remained in dry soil for four weeks practically all of the legume bacteria were killed. The use of water for mixing the inoculant was satisfactory when favorable moisture existed at planting time.

Further evidence of the value of syrup to hold inoculum on seeds was obtained in an experiment with alfalfa by the North Carolina Station and the USDA. Where a 10 per cent syrup solution was used on seed planted in dry soil in September, the yield was 1915 pounds of dry hay. Where water alone was used, the yield was only 1040 pounds of dry alfalfa.

As the Tifton results indicated, the benefits from syrup would not be expected under favorable moisture conditions, but in North Carolina it is dry often enough to justify the use of syrup.

Careful Culling

No poultryman can afford to feed a bunch of lazy, nonlaying chickens. Careful and consistent culling is important. Remember, only efficient layers pay for their keep. Try culling at night. After birds have gone to roost, they can be handled with less excitement. When culling, handle the birds carefully and gently. In this way you can do a good job of culling without causing too much reduction in laying by the remaining birds in the flock.

Another important benefit to farmers has turned up. An experiment with birdsfoot trefoil on silt loam in New York shows that this legume responds to nitrogen fertilization at planting time whether or not the seeds are inoculated. In either case, greater yields were obtained on the inoculated plots but no difference was found between the syrup solution and water alone treatments.

Somewhat similar results have

been found with Jackson soybeans. The Florida Station and the USDA reported that nitrogen fertilization at planting time increased the yield of uninoculated seed but had no effect on inoculated beans. However, the inoculated plots produced seven more bushels per acre than the untreated plots.

The Minnesota Station found that fall plowing and fertilizer increased soybean yields. A look at the soybean roots showed a decided difference in the number of nodules, depending on the amount of fertilizer used. The most numerous and largest nodules were found on plants well supplied with potash. This would indicate the necessity of potash in the nutrition of the nitrogen-fixing organism.

Farmers who grow legumes would do well to keep these new developments in mind. Maximum benefits result from proper inoculation, fertilizing, and good cultural practices. All mean more money in the pockets of legume growers.

Promising Control For Cattle Grubs Developed

A new method of controlling cattle grubs is reported by Gordon T. Mickle, Colorado entomologist. He says that U. S. Department of Agriculture research men have prevented grubs from developing within cattle by feeding an organic phosphate chemical to infested animals.

The chemical, designated for experimental purposes as Dow ET-57, moves through the bodies of cattle. It destroys grubs where they occur in an animal's flesh. However, the entomologist says, the control method is still in the experimental stages.

Mickle says cattle grubs cost the livestock industry an estimated $100 million a year in losses of meat, milk and damaged hide. A better control method would be of enormous value to livestockmen.

At present, the pest is controlled by use of rotenone, an insecticide used to treat the grub after it has made an emergence hole through the hide on the animal's back. This type of control assures some protection against future infestation. But it stops the grub only after it has spent about 7 months within the body of the animal. —*Colorado A. & M.*

80 Acre Dairyman Says, "I'm Big Enough"

Are 100-cow herds going to run the family size operation off the map? They don't scare this dairyman . . .

Condensed from Farm Journal

Glenn Lorang

FOR MANY dairymen, "Get big or get out" may be the handwriting on the wall. But Robert S. Davis, Kuna, Canyon County, Idaho, doesn't read it that way.

"I'm big enough," he counters. *Efficiency is more important than size, to me.* If the bottom drops out, I can cut my overhead to the bone in 30 days. Good cows, good roughage, and good management are my answers to high costs."

Let's see why he figures he can compete with bigger dairymen:

Davis usually has between 25 and 30 registered Guernseys in his milking string and 45 to 50 head of young and dry stock. "That's just about all we want to milk and feed and keep cleaned up. As the boys get older and can help more, we may add a few cows, but not many."

There are dairymen who handle more than 30 cows by themselves. But Davis says he doesn't like a "rush through" kind of dairying. He likes to spend a little more time with each cow, and his spare time on other important chores — like calf raising. He figures that pays off more than extra cows.

Did you ever hear of a man averaging 35 calves a year for 12 years — and losing only three? Davis' father, who handles the calves, has done it. He credits his home-made open shade and runways, and careful feeding.

Each calf has a little 6′ x 6′ shelter, and 6′ x 12′ pen facing south. As to feeding, Davis gives the calves three pounds of whole milk morning and night for the first month — then gradually less. They have alfalfa hay at all times and start getting grain in increasing amounts when they're ten days old. At four

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months, they go on good pasture, and get a little grain along with it.

"When I can raise nearly every heifer calf into a healthy heifer, I have plenty of ready-made replacements for my own herd, and can sell some surplus as registered stock," Davis says. "My heifers cost me *less* than replacements I'd buy."

There's another big reason why Davis wants to keep his herd size about where it is. "I want to be able to feed them from my home-grown grain and roughage to keep my feed costs down. I've got just about the right herd for my 80 acres now."

His feeding costs are low because he banks on roughage (including pasture) for 80 per cent to 85 per cent of the cow's nutrients. He feeds just enough grain to *supplement the roughage*—no more than six pounds a day for any cow, regardless of how heavily she milks.

"*I figure the less feed* I have to buy — the more net profit I'll make," Davis says. Last year, with 27 registered Guernseys in the milking string, his feed cost was $1.58 a hundred pounds of milk. His cows each returned an average of $349.29 above feed cost. Part of the reason for that is the fact that Davis and eight of his neighbors solved their marketing problem — they got together and bought their own bottling plant, and distribute their own milk . So Davis isn't worried about being squeezed out by low milk prices.

But to get that high profit-above-feed-cost, Davis says he banks on a couple of other items in this "I'm Big Enough" system — *good* cows and *good* roughage.

"Just *enough* roughage to feed the herd wouldn't do it," Davis says. It's got to be *good*. There isn't a cow made with a stomach big enough for poor roughage," he claims, and he keeps that in mind when he pastures, and when he makes hay.

His alfalfa hay tests 18 per cent protein because he cuts early and cures carefully; and he usually rotates his pasture every morning so that cows don't waste time on old grazing. It's always fresh.

A 50 per cent increase in the productive life of the beef cow herd requires the replacement of 50 per cent fewer females, which in turn allows the marketing of 10 per cent more calves.

When I visited Davis in May, his cows were trying to catch up with the new pasture before going on the one-day rotation. Thirty-one milkers had grazed three acres for eight days, and it looked as though they could

graze another week without making a dent in it.

To get pasture like that, Davis socks on the manure, and some super-phosphate, and experiments with mixtures of several grasses and legumes to find the best for him.

And he keeps the percentage of grass high enough to avoid a lot of bloat trouble.

Hay-making is almost a ritual, because Davis considers it so important. He cuts the first crop *before bloom,* the second and third crops when they're in about 10 per cent bloom. That way, he gets it when it's high in protein, and low in fiber.

He lets it dry in the field, and handles it *only when the dew is on* to save the leaves. "When the dew is gone, we quit haying," Davis says. "The protein is in the leaves, and I don't aim to lose any of it. We bale when the dew is on, too."

For his grain mixture, Davis grinds his corn rough — it makes up to 25 per cent of the ration. He rolls it with 50 per cent bran.

"We don't need expensive supplements with good home-grown grains and high-quality roughage. A dairyman would do better to spend his money for a baler," Davis states.

Davis hays his cows three times a day in winter — and keeps it available in summer before they go on pasture and when they're brought in at four p.m. before milking.

Now, as to the *main* key in Davis' set-up — the cows — how good should they be to keep this family-size herd paying? Davis' herd has averaged better than 10,000 lbs. of milk and 500 lbs. of fat for several years now. Two cows beat 14,000 lbs. of milk, and six more are over the 12,000-a-year mark. That means that they're up in the "high profit" bracket, well above the average herd. That's another reason why Davis isn't too worried about getting squeezed out.

Okay — so he's got good cows and cheap feed. Does he spend all the profit on buildings? No. He has $900 in a loafing-shed for the cows, and $300 in a calf barn which shelters the north side of his corral.

The ground level hay barn on the east has a concrete floor, which extends into the corral, and a roof over the mangers shelters the cows. It holds 175 tons of hay.

"That cost us $2,500," Davis says. "We built it around the hay pile with cheap lumber." It's easy to roll enough hay down to feed 20 cows and 15 heifers in five minutes.

The 12-stanchion milking barn and milk house cost Davis $4,000. I could have built a fancy milking parlor for that money," he admits, "but I like my cows, and

want to see *both* sides of them when I milk them."

Here's a little trick Davis has for saving liquid manure — his barn floor drains out into his irrigation system for his bluegrass night pasture.

It pays to pay attention to all of the little details, if you're going to make a profit on a family herd, Davis says. Like this, for example: "Some big dairymen strip their cows only when the tester comes. But we strip every time. That last squirt is our profit."

Corn Cultivation

How many times should corn be cultivated? Actually there's no "rule of thumb" to go by, according to M. O. Pence, Purdue University agronomist.

Pence says the number of cultivations necessary varies with soil type, kind of season, seed preparation, kind and number of weeds, pre-cultivation practices, and timeliness of operations. In actual practice, farmers cultivate as often as they think profitable or until the corn is too tall.

Twenty years ago most Indiana corn growers cultivated corn more than twice. However, today not more than half of the 4,000 farmers taking part in the Five-Acre Corn Club cultivate once or not more than twice. On the average, therefore, good corn growers are cultivating corn about half as many times as they did 20 years ago. Yields have increased despite fewer cultivations, Pence stated.

Four apparent reasons for fewer cultivations today are: Farmers have more power and better equipment to prepare seed beds and destroy weeds before planting; more use is being made of the rotary hoe or spike tooth harrow before the corn is large enough for cultivation; row-fertilized corn grows faster, giving less time for extra cultivations; and weeds are being controlled by other practices, such as chemical spraying, heavier fertilizations and greater corn population.

The main benefit of cultivation is weed control. However, cultivation also improves soil aeration and water intake on tight heavy soils. Once weeds are under control and the soil loose, further cultivation is of little value. Avoid excess pruning of the corn roots by shallow cultivation just deep enough to destroy weeds, Pence suggests.

—Farm News from Purdue

How To Make Better Silage

Here are suggestions for making better silage, gleaned from judging 249 samples and the experience of two top-grade silage producers . . .

Condensed from The Farmer

Robert G. Rupp

A LOT of silage is put up each year. But not all is *good* silage.

More than half of all grass-legume silage samples analyzed in the first Minnesota Silage Show, staged by University agronomist Rodney Briggs last winter, was scored down for objectionable odor. Fifty-four per cent of all supplemental samples —which includes oats and oats-peas silage—was scored down for the same reason. Surprisingly, even 40% of all corn—which is considered the easiest of all silage to make—was discounted for the same objectionable butyric, sour, putrid or foul odor.

Actually, the situation isn't that bleak. Because, as every farmer knows, silage odors vary.

When two other measuring sticks — color and condition — were considered with odor, only 7.5% of all corn silage samples were classified as poor. On the other hand, only 6% rated excellent. Of the supplemental silages—oats, oats-peas, sorghum, sudan, sudan-soybeans — 34% were poor; only 9% excellent. Of grass-legumes, 32.5% were poor; only 5.5% excellent.

"A lot of good, usable silage is put up each year," points out Dr. Briggs. "But a lot more could be made better. In nearly every silo, more careful handling could have improved quality."

Sniffed 249 Samples

A total of 249 samples of silage were analyzed during last winter's Silage Show, held at Minnesota's University Farm as a part of Farm and Home Week. They came from all parts of the state. They came out of all types of silos—uprights, trenches, bunkers and stacks. They were of all kinds — corn, all grass, grass-legumes that varied from mostly grass to mostly legumes, oats, oats-peas, and miscellaneous mix-

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tures such as corn-alfalfa, corn-soybeans and oats-alfalfa.

Here are the conclusions Dr. Briggs reached — after sniffing his way through those 249 samples — which may help you make better silage:

● Good fermentation is easier with corn than with any other silage — 94% of all corn samples had a pH of 4.2 or lower, which means they had good fermentation and weren't overly acid. Supplemental silages — those containing a grain, such as oats or oats-peas — were next easiest to make, from a fermentation standpoint. All-grass silage was next easiest. Then came grass-legumes in which grasses made up two-thirds of the mixture. Then legume-grass mixtures. Poorest, in ease of fermentation, was all-legume silage.

● Legumes usually need a preservative to make best silage. Without preservatives, only 18% of the all-legume silage samples were not too acid.

● Not only must preservatives be used, but they must be used in proper amounts. Eighty-nine per cent of the samples containing recommended amounts of carbohydrate preservatives — ground grain, molasses or whey — were in the proper acid range. But, when not enough carbohydrate was used, 87% of the samples had poor fermentation.

● Preservatives must be mixed well through the silage. Where sodium metabisulfite, a chemical preservative was used, only 48% of the samples were in the proper acid range. "This indicated improper mixing or too-dry silage," points out Dr. Briggs. When less than the proper amount of sodium metabisulfite was used, all samples were poor. A recommended way of adding sodium metabisulfite is through a metering device at the blower or chopper.

● Where liquid molasses was used, 100% of samples analyzed were in the proper acid range.

Proper Amounts of Preservatives are as follows:

Preservative	Legumes	Legumes and grass mixtures	Grass and cereals
Liquid molasses ...	80-100	60-80	60
Corn and cob meal	200-250	150-200	150
Ground grain	150-200	150	100
Beet pulp .	150	100	100
Sulfur dioxide	5	5	5
Sodium metabisulfite	8-10	8	8

● Oats and oats-peas silage is being cut too late, for the most part. For maximum yields of feed nutrients, cut when oats are in the late milk to early dough stage . . . "when you squeeze a kernel and the fluid runs out," says Dr. Briggs. "Don't wait until it oozes out, like tooth paste." Proper cutting time can be extremely short during hot, dry

weather. If cut too early, it will be difficult to pack.

Grass-Legume Cutting Time

● Proper cutting time for grass-legumes is when the legume is in early bloom and/or the grass in heading but before flowering stage. Most farmers — about 60% — are cutting at the right stage for highest quality, according to samples sent in.

● Long wilting was not practiced by those who sent in samples, although 47% wilted for two hours or more. The University of Wisconsin discourages direct-cut of grass-legumes when it means putting crops into the silo with a moisture content of more than 75%. Last year 45 tons of young, immature forage running 85% in moisture was ensiled in an experimental silo. Fifteen tons of the 45 ran off as seepage and the seepage contained 12% to 14% of the total dry matter. "Anytime there is appreciable seepage out of a silo, you are losing more than just water," says Wisconsin agronomist F. V. Burcalow. Also, higher moisture makes getting a good fermentation more difficult, points out Dr. Briggs.

● Of the 249 samples analyzed, 30% came from upright silos; 10% from trench silos; 6% from bunkers and 4% from stacks.

After all samples were analyzed, all were ranked from top to bottom by quality. Here, to give you a better idea how blue-ribbon silage was made last year, are the methods used by first and second place winners in the grass-legume and oats silage divisions.

What Winners Did

Levi Halvorson, Houston County, Minn., won the grass silage contest.

His secret — "silage you take out of the silo will be no better than the quality of the feed you put in." He got prize-winning quality with first-cutting alfalfa-brome — two-thirds alfalfa and one-third brome — put into an upright stave silo on a warm, sunny day.

Mr. Halvorson cut with a mower and raked immediately, in one operation, when alfalfa was just beginning to show a blossom here and there. Hay wilted in the windrow for about two hours. It was then chopped with a chopper set for a ¼ to ½-inch cut and blown into the silo. Sodium metabisulfite was added at the chopper at a rate of eight pounds per ton of silage.

Silage wasn't packed. Rather, this Southeastern Minnesota dairyman filled for half-a-day, let it settle, then filled another half-day.

Mr. Halvorson took his silage from second-year alfalfa-brome. The field had originally been seeded to six pounds of alfalfa

per acre and 2-3 pounds of brome, and fertilized with 150 pounds of 0-45-0 at seeding time.

"I've never gotten as much milk with as little protein supplement added," says this dairyman of his alfalfa-brome silage. "And I've saved the 300 to 400 pounds of corn that would have ordinarily gone into corn silage to boot."

Ed Trieglaff, Becker County, won second in the grass-legume division with what Dr. Briggs called "the best sweet clover silage I have ever seen."

Mr. Trieglaff chopped a ¼-red clover, ¾-sweet clover mixture with a direct-cut field chopper. The crop was cut when red clover was in full blossom and sweet clover nearly so. It was cut on a day too wet to make hay and chopped with a ⅜-inch cut. There was no wilting—silage went directly from field to wagon to silo—but a preservative was used. Sodium metabisulfite was used at an estimated rate of eight pounds per ton. It was spread over silage on the wagons, then mixed by the blower on its way into the silo.

A concrete, upright silo was used. Silage was leveled a few times during filling (it is not safe for a man to stay in a silo while filling when bisulfite is used because of gas formation), and edges were packed by walking near the top. There was no top on the silo and half-a-dozen loads were added as silage settled. One six-inch rain and one three-inch rain fell on the exposed silage during filling. There was some seepage during fermentation.

Filling took a total of three or four days.

"I got bright-colored, good smelling silage," says Mr. Trieglaff. "No matter where cattle were, they went for the bunks whenever we put that silage in."

Richard Boxrud, Lac qui Parle County, was top man in the oats silage contest.

He won with a combination of two bushels of Branch oats and 30 pounds of Canadian field peas, mixed together and seeded in late April without benefit of fertilizer. A late frost in early May knocked out 75% of the peas, so his silage ended up as mostly oats.

His crop was cut for silage when one piece of oats was in the late milk and another piece in the early dough stage. He prefers the late milk. The oats were waist-high and leaves were still green. There was no lodging. Pods were filled on what peas there were.

Silage was swathed and chopped immediately. There was no wilting. The chopper was set as close as possible in the heavy stand — under an inch. It was

a warm, sunny day. The material was blown into an upright, concrete silo which had no roof. No preservative was used. One man was in the silo at all times, leveling and tramping. A two-foot layer of alfalfa was put on top of the oats. There was no oats spoilage, but the alfalfa spoiled. In the fall, corn silage went in on top of the alfalfa. The oats silage was tramped every day for a week after filling.

Robert Shaw, Otter Tail County, placed second in the oats contest.

He used straight oats, cut in the late dough stage ("a little later than I like because I had to wait on a chopper"). The oats were chopped from the standing crop and went directly into an upright, concrete silo which did not have a top. It was cut on a windy day and chopped with a ⅜-inch cut by the same machine used on Mr. Trieglaff's sweet clover silage.

No preservative was used. No water was added. The silage was not packed, but was leveled off on top. Corn silage was added on top in the fall.

Mr. Shaw used Branch oats, seeded as a nurse crop with 250 pounds of 0-20-20 per acre. The oats were 30 to 36 inches tall when cut. Mr. Shaw's secret—"time of cutting is probably as important as anything with oats. Once you get chopped oats into the wagon it doesn't look as ripe as it does standing in the field."

Underground Storage Tanks Can Cut Gasoline Losses

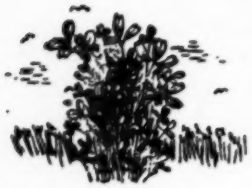
Farmers can cut their gasoline storage losses during hot summer months by placing their tanks underground and keeping them under pressure.

In a study conducted by Purdue University during the six growing-season months, only 18 gallons of gasoline were lost from a 290-gallon underground tank which was kept under 3 pounds pressure per square inch.

This can be compared with a loss of 42 gallons from a similar underground tank not kept under pressure. The same size tank above ground lost 64 gallons during the same period.

Six 55-gallon drums above ground showed the greatest loss. They contained an average of 200 gallons over the season, but lost 180 gallons during the period.

Better Legume-Grass Seedings



You can't get something for nothing. It pays to lime and fertilize your legume-grass seedings . . .

Condensed from American Agriculturist

R. P. Pennington,
Pennsylvania State University

SEEDINGS of grasses and legumes such as orchardgrass, bromegrass, Reed's canary-grass, birdsfoot trefoil, ladino clover and alfalfa, not only will outyield ordinary wild pasture but also will maintain production during the whole grazing period from spring to fall.

Yields of these grasses, higher in total pounds per acre, are very much higher in nutrients valuable to farm animals.

But we can't get something for nothing. Since these grasses produce more plant material, they require more nutrients from the soil. These soil nutrients must be replaced by the judicious use of commercial fertilizer.

Before a legume-grass combination is seeded, soil acidity should be corrected by the use of limestone. The amount of limestone required will vary with the soil. However, the quantity to apply can be determined easily by a simple laboratory test performed by a soil testing laboratory.

This test will tell you the number of pounds of limestone you should add per acre to bring the soil to the pH which will most efficiently produce the legume-grass combination. The use of this lime will not only help your legume-grass combination but will also make for more efficient use of fertilizer.

This lime should be well mixed throughout the upper layer of the soil. The simplest way to do this is to add one half of your limestone, plow, and then add the other half of the limestone required and disk or harrow it in.

Another fertilizer nutrient that is very important prior to seeding is phosphorus. Phosphorus moves very little in the soil. The only chance to get the phosphorus distributed through the upper layer of the soil is at seedbed preparation. Thus, we generally advocate the addition of any-

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where from 400 to 600 pounds of 20 per cent superphosphate that should be worked into the soil when the seedbed is being prepared after the limestone has been added.

The next addition that should be made is a small amount of a 0-1-1, 0-1-2, or 1-2-2 fertilizer. This generally means application of 300 to 400 pounds of 0-20-20 or its equivalent, 300 pounds of 0-15-30, or about 300 pounds of 5-10-10. The 5-10-10 is particularly useful where birdsfoot trefoil is seeded. Since birdsfoot trefoil establishes slowly and fixes very little nitrogen in its early stages, the small amount of nitrogen in the 5-10-10 is very helpful in starting this legume.

When the land is fertilized as described, a good grass-legume mixture should be seeded. The seeding used should be based on recommendations by the county agent in your county. His recommendations are based on the results of research. We have found that the legumes and grasses vary similarly to the different hybrids in corn. Therefore, it is wise to make sure that the legume-grass combination best suited to an area is used.

Once a grassland mixture is established, probably the most important element to be added as fertilizer is potash. Legume crops require large amounts of potash, but unfortunately due to their root systems they cannot compete for it as well as grasses. This means that in order for the legume to have sufficient potash, the potash level of the soil must be kept very high.

All-Time Low in Farms

Farms in the United States now number 4,782,000, according to the summary of the 1954 Census of Agriculture released by the U.S. Department of Commerce. This represents a decline of 600,000 since 1950. The number of farms declined from 1950 to 1954 in every state except Florida, and in all except 180 of the 3,067 counties in the United States. There are now fewer farms than at any time since 1890.

In order to do this we generally recommend the addition of 400 pounds of 0-15-30 or its equivalent per acre or an 0-20-20 or its equivalent. This annual application is generally made in the fall as soon as possible after removing the last pasturage or the last hay clipping.

Now let us look at some results to see what this kind of treatment means in terms of production. In Susquehanna county, Pa., on an area that was producing somewhere around 1,000 to 1,500 pounds of a low-grade

hay annually, such treatment was carried out. For the last three years we have removed between 3 and 4 tons of high quality legume-grass hay annually from this area.

The cost of preparing this land was relatively high since the lime required was approximately 5 tons to the acre. This meant that in the first year, $60 per acre was spent to grow some of the better and higher yielding grass and legume crops. However, if we evaluate the hay crop at $25 per ton, the $60 was returned the first year, and in the past two years a high profit has been realized and will continue for a long time.

We believe that over the next period of years a good sound pasture and hay program can be the most lucrative part of the farmers' program. However, remember, if you have renovated pastures, they are high-producing crops and as such require the addition of nutrients. These crops yield high economic returns and retain the soil against erosion and leave it in good structural condition. But they need nutrients to produce.

Barn Fogger Stops Summer Milk Loss

Barn-fogging units help discourage insects from harassing dairy cows all summer and cutting into milk profits. E. H. Fisher, University of Wisconsin insect control specialist, says the best kind of barn fogger for flies and mosquitoes is a four-nozzle model that hangs in the center of the barn. Each nozzle aims the insecticide mist at a different corner.

This spreads fog evenly and gets a small amount of insecticide over a larger area without moving the unit. Keep the compressor pressure at a minimum of eight pounds per square inch at the nozzle for barns up to 60 feet long. Increase the pressure to 16 pounds or more for barns up to 100 feet. Larger barns need two fogging units.

Fog the barn just before milking with all the cows in. This gives cows a protective coat of insecticide to ward off flies and mosquitoes in the pasture. It takes about one ounce of insecticide for each 10 feet of barn length. A good ready-mixed spray is one containing .1 per cent pyrethrins, according to Fisher.

—University of Wisconsin

Root Rot Threatens Soybeans

Some varieties are resistant to a fungus that kills Ohio soybeans . . .

Condensed from Ohio Farmer

A. F. Schmitthenner, Ohio Experiment Station

IN PAULDING County, Ohio, last August (1955) it was common to see farmers plowing up their soybeans for wheat. Fields which had promised so much earlier in the season were just a mess of weeds and dried up soybean plants. A root rot caused by a fungus had taken over.

The first alarm came in 1951. The next year, plant disease experts from the experiment stations received an urgent request to come to Paulding County. There they saw several large fields of dying soybeans and a group of anxious farmers. What they saw was not a known disease, but something new and deadly.

Skeletons of soybeans of all sizes could be seen, scattered throughout some fields and localized in the lower, wetter spots in others. Many plants were wilting. The roots of such plants were generally badly decayed below the soil level and often as much as several inches above. Some soybeans were stunted but otherwise healthy looking. Internal decay and discoloration were quite common in the roots and lower stems of these plants. In several of the fields, every soybean had been killed or injured by the root rot.

During the next two years, in a study on the cause of this root rot, hundreds of molds were obtained from roots of diseased soybeans. Of all these, only one type was able to produce the disease when placed in contact with soybean roots in the greenhouse. This fungus, called Phytophthora, is closely related to the one causing late blight of potatoes.

It was determined that the Phytophthora fungus killed Hawkeye soybeans, but did not affect Monroe. It had been observed in the field that Monroe was resistant to the disease and Hawkeye very susceptible. With this evidence there was little

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doubt that the Phytophthora was the cause of the disease.

The disease and its casual agent were studied extensively in the greenhouse. The fungus was found to be soil-borne—not present in soybean seed. The disease was more severe at temperatures of 80 and 95° F. than at temperatures of 60 degrees. Seed treatment with fungicides and planting with fertilizers delayed the onset of the root rot but did not prevent eventual death of susceptible plants.

The fungus was not able to rot corn, wheat, oats, alfalfa, red clover or timothy. It has been observed that the disease damages soybeans in rotation less than soybeans planted year after year in the same field. From our studies in Paulding County it is apparent that crop rotation can only partially control the disease.

The one sure method of controlling this rot is to plant a resistant variety. Some 90 different soybeans were tested for two years in Ottawa County, Ohio, at the farm of Antony Schibilla; and for one year in Paulding County at the farm of Ansel Bidlack.

The disease was extremely severe because of a five-inch rain in July. Hawkeye, Lincoln, Adams, Earlyana, Harosy and Bavender were all badly killed and stunted. Only Monroe and Blackhawk, both early varieties, stood up well. Several new strains of soybeans, developed from Monroe-Lincoln crosses, also looked good in these tests.

For every two days the average American works in commerce and industry today, he gets one day off. A Colorado recreation specialist, Stewart G. Case, reports that the average worker has 125 days away from his desk or workbench each year. "That's only the beginning," says Case. "Today's 40-hour week likely will drop to 37 hours by 1960 and, thanks to automation, probably to 30 within the next 10 years

We recommend that Monroe or Blackhawk be planted in fields where Phytophthora root rot has been observed in past years. Monroe and Blackhawk may not yield as much as Lincoln, Hawkeye and Harosoy but a lower yield is better than nothing at all. This root rot fungus can quickly build up in the soil to the point where susceptible varieties are completely wiped out.

The problem has only been found on the heaviest of clay or silty clay soils. If you have any such soil on your farm, we urge you to keep a lookout for this disease. Watch for plants dying throughout the season.

Evolution In The Cornfield

Coming events cast their shadows before and predict a growing popularity for the corn combine

Condensed from The Furrow

Ralph Hughes

A WARM October sun cast three shadows of destiny in 1924. One shadow was that of Fred Stanek of Fort Dodge, Ia., as he toiled to win the first national corn-husking contest — with 24.3 bushels husked in 90 minutes.

Nearby, one of the new mechanical huskers was being exhibited. It shucked three times as much corn as did Champion Stanek — another shadow of things to come.

Over 9,000 miles away, a machine which husked and threshed corn in one operation cast yet another shadow for the future. After watching this machine, H. C. Quodling, Director of Agriculture in Queensland, Australia, wrote: "This complete harvesting machine will not only reduce corn harvesting costs to a minimum, but will eventually prove to be one of the most notable inventions of all time."

What of Corn Machinery Today?

In two decades between World Wars I and II, the national corn husking contest was born, flourished and died—the greatest farm athletic event in history. In 1941, the final contest was held as the climax of a 4-day celebration at LaSalle, Ill., attended by 150,000 persons and with all the bustle and color of a state fair. This shadow has vanished.

The fanfare of the contests, however, didn't overshadow the great benefits of the mechanical corn picker. By 1930, farmers were using 30,000 corn pickers; and there are an estimated 689,000 pickers on American farms today.

The mechanical picker was a boon to agriculture for it elim-

Reprinted by permission from The Furrow, Moline, Illinois

inated one of the hardest, back-breakingest, time-consuming farm jobs. Hybrid corn, with its strong-standing stalks and uniformity, as well as excellent yields, helped make possible the rapid acceptance of mechanical husking. Corn pickers of today are considerably improved over their prototypes of 1924.

Considering their size and weight, dairy cows require more water than any other farm animal. The reason is clear when you consider that milk is 85 per cent or more water. A cow will drink from three to five pounds of water for each pound of milk produced.

The mechanical corn picker is by no means down-and-out—too many types of farm enterprises require the harvesting of ear corn. But, this second shadow is fading, too.

The corn combine, the third shadow—the shadow of the future—is here today! And with it has come greater efficiency and easier handling of this important crop.

Corn combines have brought greater efficiency not only for the large-acreage farmer, but for the smaller operator as well, and in all his combineable crops. For, with the addition of corn, many more farmers can justify the investment in a self-propelled combine, as well as additional grain-handling equipment, to streamline their harvest and storage methods.

This third shadow—now rapidly creeping from cornfield to cornfield—will become a familiar sight to thousands of farmers, and they will find themselves completing their corn harvests earlier and easier, as the autumn seasons come and go.

Reduces Corn Losses

One of the most important advantages of corn combining, particularly when the snapping-bar system is used, is the reduction of field losses. With a regular picker, shelled-corn loss usually amounts to about half the total field loss and will average 5 per cent of the total yield. Thus, with corn yielding 65 bushels per acre, this figures out to a $5 loss per acre, at prices prevailing during recent years. Experience with the snapping-bar system has shown this shelled corn loss reduced by at least half. This will mean a saving of about $250 on a 100-acre field.

While the saving in reduced shelling losses is an important one, the saving in ears is significant, too. With a combine, corn can be harvested earlier and much of the loss from fallen ears due to wind and corn borer is prevented. In addition, the plants

are healthy and upright early in the season so that losses from rotted, fallen stalks are at a minimum.

By harvesting corn with a combine 10 days to 2 weeks ahead of normal, many farmers were able to sell at least a part of their crop at "old corn" prices. This early harvest can have further advantages in permitting application of fertilizers at early fall discount rates; in leaving time for completion of fall work; and, for the stock farmer, it leaves a longer season to let the cattle run in the fields after harvest and before heavy snows.

Saves on Field Equipment

Since prices of combines, pickers, and picker-shellers vary, we cannot actually show the dollar-saving on field equipment but the basis of comparison is simple: a corn attachment for a combine can be compared with a mounted picker to show a saving of about 30 per cent with the attachment. The cost of a combine plus corn attachment can be compared with the cost of a combine plus a picker-sheller — a saving of 20 per cent in favor of the combine and corn attachment.

Saves on Shelling and Storage Costs

Shelling is the extra cost on corn, like threshing used to be with small grains. Now, with combining, this expense of 3 to 5 cents per bushel is largely saved—totaling $195 to $325 per year on 100 acres of 65-bushel corn.

It is, however, in storage costs that corn combining really shows a big advantage in capital costs. With ear corn you have to store the cob, and the crib structure itself is expensive.

A wood crib costs about one dollar for each bushel of storage space, a steel bin costs about 40 cents per bushel. By storing shelled corn in a steel bin instead of ear corn in a conventional crib, a farmer can save as much as $6,000 on 10,000 bushels of storage. This saving alone will more than pay for a complete drying setup needed on many farms.

Corn is Cleaner and Easier to Handle

Because of its large cleaning capacity, the combine produces corn that is clean and in good condition for storage. Trash and floury materials are common starting points for spoilage in any grain.

Barnyard automation is in the minds of most farmers today. And shelled corn lends itself to easier handling — augers, elevators, blowers move shelled corn from truck to bin, from bin to grinder, and from grinder to self-feeder without the use of a scoop shovel. These automatic

systems are likely to change the whole picture in beef cattle feeding and dairying for, while ear corn can be used, it is easier and less expensive to use shelled corn.

Drying Necessary

In all but the very dry climates, it is necessary to dry field-shelled corn before it can be stored. In some areas, unheated air can be blown through the corn to dry it inexpensively. However, in most parts of North America, the air is not dry enough for this, so heated air must be used.

For safe storage, corn should be dried to at least 12½ per cent. However, if the corn is to be put on the market immediately, it needs much less drying. Number 2 corn grade is based on 15½ per cent moisture so it does not pay to dry below this point. In fact, it is usually best to stop at 16 or 17 per cent. In many situations, if the corn has been harvested at 20 per cent or lower, it doesn't pay to dry it at all.

Backrubbers Help Cattle Control Pesky Hornflies

Cattle themselves can control those pesky hornflies — if they get to an insecticide-soaked backrubber.

T. R. Robb, Wyoming extension entomologist, says that cattlemen can easily make backrubbers for about $5 apiece. Another $5 per backrubber will pay for insecticide for the entire season. And one backrubber can take care of well over 100 head of beef or dairy cattle.

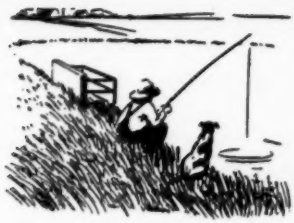
Only materials needed to make a backrubber are posts, burlap, twine, and barbed wire, chain or wire rope. To build the usual type, set the posts about 16 feet apart and brace them.

If using barbed wire, make a cable of three strands twisted around a fourth or around a length of No. 9 smooth wire. Fasten the cable to the posts 4 feet from the ground and leave enough slack to let it sag within 18 inches of the ground.

Wrap burlap strips or sacks around the wire to make a thick bundle — it takes 12 to 14 sacks per backrubber. Tie the sacks on every 4 to 6 inches with twine. Soak the sacks with a recommended insecticide and the backrubber is ready for business.

Your county agent can give construction tips, names of recommended insecticides, and mixing instructions.

Wyoming College of Agriculture



You May Be Eligible for an Irrigation Loan

In a banker's magazine, bankers tell other bankers how to evaluate requests for loans on farm irrigation systems . . .

Condensed from Banking

W. C. Johnstone, Kentucky Banker's Association

"WHEN financing irrigation systems better look twice at the capacity factor," advises J. D. Brown, executive vice-president of the Peoples Bank, Taylorsville, Ky.

I stopped by to talk to "J.D." about financing irrigation systems because he is not only a top country banker but is an excellent dirt farmer in his own rights.

"J.D." installed his irrigation system in 1951 and has used it through both good and bad seasons. His personal experiences with irrigation has given him information valuable to farmers looking into the practicality of installing systems and to bankers who might be called upon to finance them. I had a few questions to ask him for my own guidance and, in addition, I wanted to get first hand informaiton on how bankers handle irrigation loans.

Good Investment

First, I asked Mr. Brown if irrigation was a profitable investment in Kentucky, especially on the hill-land of Spencer County where tobacco and alfalfa are sometimes grown on slopes up to 15%. "Sure it pays," he said, "my system paid for itself in three years and some of them will pay out in two." Then, in true banker style, he hedged. "Well, maybe I had better not be too positive. Irrigation will help a good farmer do a better job but it won't make a good farmer out of a poor one. If a man is not a good manager he had better not go in debt for an irrigation system."

To support his statement on the profitableness of his system "J.D." reached into his desk drawer and pulled out his farm account book. There was the proof. "J.D.'s" landlord's share of the last two "B.I." crops (Before irrigation) brought $3,130 and $2,393, respectively; the first two "A.I." crops (After Irriga-

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tion) brought $3,689 and $4,482, even though there were fewer acres in the latter two years. And, in addition he had used it on strawberries and other crops.

"J.D.'s" experience was pretty well duplicated by Jones Mercer, president of the Potter-Matlock Bank and Trust Company, Bowling Green. When Mr. Mercer installed his system in 1954 one of his two tobacco tenants did not want to participate in the additional costs and resulting benefits. The tenant who irrigated netted about $240 per acre more than the other. Needless to say both tenants used the system in 1955.

There are many factors involved in the successful operation of an irrigation system, agree Brown and Mercer. "The first thing to look into is the supply of water. That is often a very limiting factor," they say.

Mr. Brown gets his irrigation water from Beech Creek but in dry seasons the flow drops to a trickle and even the pools formed by small dams won't supply the amount needed for many acres. He is now in the process of increasing both the water supply and the capacity of his equipment. "If you have to depend on streams for water," advises Mr. Brown, "you had better check with your state conservation department. We don't own the water that runs through our farms —we just have the right to use it, provided we don't interfere with the other fellows' needs for domestic use."

Reservoirs

Most farmers in Kentucky will have to depend upon reservoirs for their water supply. The cost of these vary greatly, depending on the topography, geology, and soil type. Very often the cost of developing an adequate water supply is too great to make irrigation practical. On the other hand a good reservoir, one large enough for fishing and boating, as well as for irrigation, stock water and fire protection, may well be worth its cost. The cost of water from large reservoirs, per irrigated acre, is much less than that from small reservoirs.

"Assuming that a farmer has a supply of water adequate for irrigation, what are some factors which determine the success of a system?" I asked "J.D."

"Good management," was the quick reply. "There are many things that determine the success of an irrigation system, but they can be lumped in one word — Management — and for that there is no alternative," he added. Then he went on to elaborate, "You've got to use a system to make it pay. The more you use it, the better it pays. Installing an irrigation system just for one crop is not efficient under our conditions here in Kentucky. A

diversity of crops is needed to stretch the supply of water and make efficient use of labor and equipment. A farmer who can use his system for strawberries, tobacco and alfalfa, for instance, will pay for it quicker than the man who uses it just for tobacco. And don't forget the garden," he cautioned. "With my family and hired help we have nine people to feed. A good garden cuts living costs many hundred dollars a year, and there is no more profitable place to use water than on the garden.

"Irrigation always pays off much better on high-acre-value crops than on low-value crops. Its use on field corn and soy beans is of doubtful value under our conditions."

Pastures

"What about irrigating pasture?" I asked.

"That's all right provided you have good pasture crops to irrigate and good cattle to graze it. Sudan grass is one of the best pasture crops to irrigate. It stands the heat well and produces an enormous growth when plenty of fertility and water are available. I doubt if it would pay to irrigate for beef cattle or sheep but it really pays with good dairy cattle," says Mr. Brown.

Another factor to be taken in consideration is the fertility of the soil. It never pays to irrigate crops on land where fertility is a limiting factor. A soil test should be made and all needed plant nutrients applied.

"What about financing irrigation equipment?" I asked several bankers. The answers were essentially the same. "Any good customer of our bank can get money for an irrigation system on the same basis as he can get it for any other costly equipment," said Max Sanders, president of the Stock Yards Bank, Louisville. "We want him to show us a well developed program for using the equipment and a satisfactory repayment plan," he added.

Banker Jones Mercer made the observation that the farmer with a small acreage could not afford to own an outfit for his sole use, unless he had a very intensive cropping program with high value crops. He might buy it in partnership with a neighbor or do custom irrigation for others. Mr. Mercer says that irrigation is like television: it was a luxury a few years ago but is almost an essential now, especially for good managers with plenty of water. "A good irrigation system takes a lot of risk out of farming," he says.

J. D. Brown thinks that if a bank is going to make many irrigation loans it had better have a good "outside-man" on the staff. Credit for irrigation equip-

ment is usually of an intermediate-term type and will usually run from two to four years. Conditions should be carefully studied and analyzed and some follow-up work done. In the hands of a good operator, a properly installed system will lessen the hazards of droughts, make farming safer, and enhance the value of real estate and production loans.

In 1955 there was a 30 per cent improvement in closing the gap between too much production and too little consumption of milk.

Advice from Engineer

Every farm presents conditions peculiar to itself and requires a "tailor-made" outfit. Hence bankers, considering irrigation loans, should insist that the borrower obtain sound advice from a qualified engineer, such as is available from the Extension and Soil Conservation Services or from reliable dealers in irrigation systems.

Crusher and Dryer Shorten Haymaking

Weather records show that hay crushers and barn driers pay off in Wisconsin, says H. D. Bruhn, farm engineer at the University of Wisconsin. From 1905 to 1950, there were, on the average, about four periods each month during June and July when there were three consecutive clear days.

Putting in loose hay without a crusher or drier usually means it has to be "field cured" until the third day after cutting. There were six times during each month when there was clear weather for two days in a row, and 17 single days of sunshine in a month. This means that anything a farmer can do to shorten haymaking time improves his chances of getting hay in without its being rained on.

Either a field crusher or drier alone will cut haying time by one day, says Bruhn. Use both, and — in most cases — you can mow the hay in the morning and haul it to the barn in the afternoon. Crushers and driers also mean better quality hay. With ordinary field curing, the leaves dry faster than the rest of the hay and shatter off when the stems are dry enough to haul in. But by crushing the hay when it's cut, the stems dry just as fast as the leaves and the hay can be hauled in before the leaves become too brittle.

With a barn drier, the hay can be put in the barn at 30-35 per cent moisture and mechanically dried to about 20 per cent — just right for storage. *Wisconsin College of Agriculture*

Wind Erosion Can Be Reduced

Proper land use, stubble tillage, strip-cropping, and other recommended practices are proving highly effective in reducing wind erosion . . .

Condensed from Kansas Farmer
Dick Mann

PERMANENT CONTROL of wind erosion starts with proper land use, says W. S. Chepil, USDA soil scientist stationed at Kansas State College. Mr. Chepil and Neil Woodruff, of the same office, have spent several years studying causes and control of wind erosion in the Great Plains area.

"It has been established in 'dust bowl' surveys," says Mr. Chepil, "that the most severe wind erosion occurred on classes 4, 6 and 7 land which was being cultivated. It is necessary that there be a sound regrassing program on land unsuitable for cultivation. This objective should be first in every area where wind erosion is severe."

Next in importance is keeping vegetative cover on top of cultivated fields by means of stubble mulch tillage. "The Black Blizzard of 1935 could have been prevented if the western half of Kansas had been under stubble mulch for the 1934-35 wheat season," says Frank Lowry, superintendent of the sandy land experiment field, in Stafford county. "After experimenting with stubble mulch tillage for 3 cropping seasons (the driest on record for the area) I am convinced this method is the answer to wind erosion, especially if practiced on a community-wide rather than an individual farm basis. It has definitely stopped wind erosion on the experiment field, and this field was a serious problem before the experiments began."

At the sandy land experiment field Mr. Lowry has been using a Noble blade, which is one type of stubble mulch equipment. This implement has a single blade that undercuts, leaving all residue standing. "You must grow your cover in summer and maintain it," says Mr. Lowry. "You can't wait until fall. I wait until weeds are up 8 to 10 inches, then undercut with the sweep blade. By letting weeds grow you sacrifice some moisture in favor of cover. But, you

Reprinted by permission from Kansas Farmer, Topeka, Kansas

make it up later when fall rains come."

If, after undercutting, you have a heavy cover at wheat seeding time it may be necessary to use a stubble mulch drill having a rolling coulter or leading disk to cut trash ahead of the grain boot, Mr. Lowry explains. Several companies are now making drills satisfactory for seeding in this type seedbed. If cover is light, any wheat drill can be used.

"One advantage of using an undercutting implement," says Mr. Lowry, "is that you can safely work sandy soil when it is too dry for other tillage implements."

Show Stubble Mulch Value

Value of stubble mulch was demonstrated in Stafford county this year. Rainfall records show moisture for the last 4 years has been 20 inches less than the 4 driest years in the 1930's. Fields in the area were beginning to blow in January.

One area of Stafford county that got 6 inches more rain last fall than fell on the experiment field was blowing in January. The only difference was in methods of cultivation, so you have to give stubble mulch tillage the credit.

In Stafford county in 1955, some summer-fallow wheat made 20 bushels but a lot of continuous-cropped wheat made only 1 to 3 bushels.

W. H. Shank and son, Robert, are using stubble mulch tillage on 300 acres. Two hundred acres are seeded to wheat and 100 acres are in summer fallow. They were getting no blowing this past winter, altho 2 of the 3 fields previously had been subject to severe blowing. Robert Shank says: "I think summer fallow will pay here on sandy land if we can hold our soil while doing it. Stubble mulch seems to be the answer."

Will stubble mulch do as much for heavier soils? "Yes," says William Duitsman, superintendent of the Hays Branch Experiment Station. "If we had to get rid of all our tillage implements our undercutting tools would be the last to go."

In stubble mulch experiments at the Hays station, attention has been centered on the effect of various types of tillage on moisture penetration. In 1954 various methods of summer fallow following wheat were studied.

Plot 1 was plowed and clean cultivated. In the fall the plot had a moisture penetration of 25½ inches.

Plot 2 was gone over with a one-way the first 2 operations. Moisture penetration by fall was 25½ inches, same as for Plot 1.

Plot 3 was given stubble mulch treatment (undercut at each cultivation). Moisture penetration

was 34½ inches.

More Rain Is Held

"This meant stubble mulch held an extra 1½ inches of rain," says Mr. Duitsman. "Since every inch of moisture saved increases wheat yields at Hays 2 bushels an acre, we could be safe in saying stubble mulch tillage resulted in a 3-bushel-an-acre increase in yield. Each inch of additional moisture will mean 3 bushels more grain sorghum.

The difference in favor of stubble mulch over clean cultivation is greatest when hard rains occur. Hard rains tend to seal over clean fields and run off.

Another experiment at the Hays station tested effect of winter cover. One field was one-wayed and another undercut. Both were then left all winter. The one-wayed field had a moisture penetration the following spring of 18 inches. The undercut field had 36 inches of moisture penetration. This was equal to getting 3 more inches of rain.

The 2 fields then were planted to sorghums, part to milo and part to Atlas. The undercut field planted to milo made 10 bushels more grain to the acre and the Atlas made a good forage crop. Forage on the one-wayed field had to be cut early.

Raymond Curtis, Barton County Work Unit Conservationist, says: "Stubble mulch won't perform miracles. Where soil has lost fertility it is harder to grow cover in either hard or sandy soil. We must be patient — adopt soil and crop management programs to rebuild organic matter lost during 45 or 50 years of cultivation. Some sandy land does not have enough phosphate to grow cover. We may have to reclassify some land and put it back to grass. On some of the other land we may have to use milo and vetch rotation and wheat-wheat, plus fertilizers."

Strip-cropping, if done on a community-wide basis, will help stop wind erosion in most years, says Neil Woodruff, USDA soil scientist. If you go to strip-cropping you may have to experiment to determine how far apart

Psychological Approach

The young farmer's wife, a city girl, was in the habit of making extended visits to her parental home. On one trip, despite several urgent requests from her husband, she stayed for several weeks. Desperate, the young husband mailed her a copy of the small-town weekly newspaper, first clipping out one small item from a column headed, "Local Gossip."

Two days later his wife was back at the farm.—The Furrow.

strips should be. They need to be close in sandy soil, further apart in firmer soils. Shelterbelts also protect fields.

If stubble mulch is such an advantage why haven't farmers changed over to that type of cultivation? We asked this question of Mr. Lowry. "There are several reasons," he says. "First, is the cost of changing equipment. Second, is the radical change in thinking required to turn from clean cultivation to leaving the surface undisturbed. In stubble mulch tillage a farmer does not get the feeling of achievement that comes from turning over the soil. Altho stubble mulch farming requires about the same number of operations as clean cultivation, time required may be a little longer as you don't usually cover as much width in any one round, altho the Noble blade we were using was a wonderful tool in ease of handling."

Use of water for all purposes in the United States has doubled twice in the last 50 years and is expected to double again in the next 25 years.

If you are one of those farmers who are not making any long-range plans for permanent control of wind erosion we might pass on this warning from Mr. Lowry: "I contend that emergency tillage is a bankrupt policy which, if continued long enough, will wipe out a farmer's financial reserve."

Pruning Ups Tree Value

A farm woodlot owner can increase the value of his trees up to $500 per acre by pruning, asserts Walter Lemmien of Michigan State University's forestry department.

He advises woodlot owners to prune 150 to 175 trees per acre, and any species of tree that will yield desirable lumber can and should be pruned. Crop tree pruning, he explains, consists of removing the lower side branches flush with the trunk of the tree. This should be done with a saw. Other tools, he cautions, may wound the tree and leave stubs.

With timely pruning and management, the butt log will yield about 60 per cent clear lumber. Healing of pruning wounds usually takes about five years. After healing, clear wood without knots will form over the knotty core. —*Michigan State University*

Fast Gainers are Good Type Bulls

Research at Michigan State University has answered questions concerning gaining ability . . .

Condensed from Michigan Farmer

Cal Orr

WITH ALL the stress on type in beef animals, does this mean a bull of good type won't gain as fast as an ordinary looking animal?

Tests at the Michigan Experiment Station indicate that faster gaining bulls are of as desirable type as the slower gainers. They also show that a good type bull is as likely to be an economical gainer as a sire with a less desirable type.

The Michigan tests are beginning to answer questions long sought by beef cattlemen. Some of Michigan's leading beef breeders lend their bulls for use in the tests at the Lake City Experiment Station.

Four steers from each of these bulls are fed out to determine how much of a sire's superiority is passed on to his offspring in the way of rate of gain, economy of gain and type.

Beef Researcher William T. Magee indicates that 2 years' work shows that the bulls control about one-fourth of the variation in carcass grade for their calves.

So if you estimate that the cow also controls a fourth, then the parents are responsible for half of the variation in carcass grade. What controls the rest of the variation is feeding and many other unknown things.

Researchers still are working on ways to find out which live animals are going to make the best carcasses. Even the experts are fooled many times.

As for the cow's influence on the weaning weight of her calves, tests at Lake City show that it's mighty important.

Mature cows wean calves that are about 40 pounds heavier than calves from 2-year-old dams and 20 pounds heavier than offspring from 3-year-old cows. That's because older cows are larger and they give more milk.

The tests also showed that for each day older a calf is at weaning time it will be about a pound and a half heavier than the av-

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erage of all your calves. And steer calves average about 15 pounds heavier than heifer calves.

Magee figures that about 50 per cent of the variation in weaning weights of calves is due to the cow. The bull's part in weaning weight isn't so important because he doesn't have to nurse the calf. But the sire and the place in which the calf is raised cause the rest of the variation in weaning weight.

Pig Feeding Facts

Indiana 4-H youths entered in pig projects have been given some valuable tips by Richard Hollandbeck, Purdue University extension swine specialist. Commercial pork producers may also profit from Hollandbeck's advice.

For maximum gains on good legume pasture, pigs between 40 and 70 pounds should be given a 6-2-2 ration. The Purdue specialist said that in each 100 pounds of ration, there should be 60 pounds of coarse ground shelled corn, 20 pounds of coarse ground oats or wheat, and 20 pounds of protein supplement. And, it's a good idea to fortify the ration with a vitamin B12-antibiotic supplement. Ten to 15 grams of antibiotic should be added per ton of ration.

A 7-2-1 ration is suitable for pigs on pasture from 75 to 100 pounds up to exhibit or market time. A 100 pound ration would include 70 pounds of coarse ground shelled corn, 20 pounds of coarse ground oats, and 10 pounds of protein supplement.

Proper development of spring pigs depends on a system of feeding and management which will insure rapid, continuous and economical growth. Good clean feeding and sleeping quarters give the pigs a healthy environment and help to control many of the common diseases and parasites.

Fresh water and shade should be available at all times with feeders placed nearby. Watering devices should be fastened down to insure a constant water supply. Mud holes can be filled with gravel or corn cobs. Eight square feet of shade for each pig should be provided. A shade shelter should be four to five feet high for free circulation of air, Hollandbeck says.

—*Purdue University*

Good Management Grows Good Broilers

This Maryland farmer has a good formula for success . . .

Condensed from American Poultry Journal

John C. Brown

VICTOR RIECK of Preston, Md., grows 19,000 broilers, 4 times a year.

He grows his birds in 3 houses. Two of the houses are 150 x 20 ft. in size and house 4,000 broilers each. The third house measures 200 ft. x 40 ft.; 11,000 broilers are grown in this house. The 2 smaller houses have aluminum roofing and asphalt siding, while the larger house is covered entirely with aluminum sheeting and roofing.

Aluminum was chosen as a building material because of its ability to reflect much of the heat of the sun's rays. During the summer months, the choice of aluminum has paid off for Rieck in broiler houses that are considerably cooler inside than the temperature outside the houses. Even on the hottest summer days, the birds remain reasonably comfortable inside the broiler houses. There is seldom any trouble with birds dying because of the heat.

All the houses have large double doors at their ends which allow a tractor and manure spreader to be driven into them at clean-up time. Litter and droppings are quickly loaded into the spreader, hauled to the fields and applied to the land.

In the larger house, brooding is done with a hot water brooding system. Individual coal brooder stoves are used for brooding in the smaller houses. Of the 2 brooding systems, Rieck prefers the centrally heated hot water system in the larger house. There is far less labor connected with this system, temperature is easier to regulate and control, and there is less fire hazard.

All chicks are vaccinated for Newcastle disease when they are day old. Night lights are employed from the time the chicks are placed in the houses until

Reprinted by permission from American Poultry Journal, Chicago, Illinois

they are loaded out as broilers for market. Rieck feels that all night light pays him in growing broilers. He says that the lights help him to get more feed into his birds in a shorter time. He finds the all night lights especially useful during hot weather when birds are inclined to eat less during the day because of the heat. The all night lights allow them to catch up on their daily feed requirements for good growth, at night, when the temperature is usually lower and when birds are more inclined to eat.

Rieck realizes that plenty of available drinking water is necessary if the birds are to eat as they should for fast broiler growth. In fact a bird will drink about 2 lbs. of water for every pound of mash it eats. That is why there are plenty of automatic waterers conveniently located in all 3 houses. A bird never has to walk any distance for a drink. Feed is fed from large drum type gravity feeders, scattered liberally throughout the houses.

In addition to a liberal number of windows, each house is equipped with numerous ridge type ventilators for the purpose of removing stale air.

Since processors have been favoring white plumage birds, Rieck has been growing white crosses. He grows them to a 3½ lb. weight on a 2.9 feed conversion in about 10 weeks. He sells his broilers at auction.

In addition to his broiler enterprise, he also farms 200 acres in corn and soybeans. The manure from the 76,000 broilers he grows a year supplies plenty of fertilizer for his land. The application of this manure to the land has added greatly to its fertility and helped increase crop yields.

Vast Increase Seen for Poultry

Young people starting out in farming today can look forward to a poultry market in 1975 far greater than now, predicts Willard McAllister, agricultural economist at the University of Delaware. McAllister bases his figures on an estimated U.S. population increase of 35 to 50-million people by 1975.

Even if there is no increase in the amount of chicken eaten per person over what is consumed today, this would mean a demand for at least 208-million more broilers and fryers in 1975 and possibly as many as 300 million more. Housewives will be ordering from 12 to 18 million more turkeys as well. To produce all the eggs they will want to buy will call for 80 to 113 million more hens—that is, unless hens start laying a lot more eggs each year than the present 184-egg-per-hen national average. *—Delaware Extension*

Late Report on Beef Cattle Dwarfism

Recent research has thrown interesting light on a problem baffling many beef raisers. Profilometer for detecting identifying head bulge of dwarfism is illustrated at left . . .

Condensed from
Texas Livestock Journal

Dr. Leslie E. Johnson,
Iowa State College

DWARFISM, as the name indicates, represents a condition in which an animal fails to grow and develop normally. Hereditary types of dwarfism have been recorded in man, cattle, sheep, swine, mice and other species of animal life. In most species the frequency of the defect has been small.

Previous to the last decade several kinds of dwarfism had been reported from various breeds of beef cattle in several countries. In general, each of the early type of hereditary dwarfism appeared to be inherited as a simple recessive and caused little loss to producers. In recent years, however, a new type has appeared which has increased rapidly in occurrence and has caused much concern to both purebred and commercial producers. This type has been called by many the "Snorter" dwarf.

The "Snorter" dwarfs are usually born alive with a fair chance of survival. While there is considerable variation among the dwarfs, they are characterized by their blocky appearance; short, compact body; bulging forehead; prominent eyes, protruding lower jaw and tongue; and low hanging head.

At times, the better dwarfs have been mistaken at birth for outstanding show prospects. None develop normally, however, and incoordinate gait, large middle, and heavy breathing are common developments in the affected calves. Rate of mortality following weaning of dwarfs may be high under some conditions. Many dwarfs, both male and female, however, do live and will produce offspring if well cared for. It is usually necessary to take the young from dwarf

Reprinted by permission from Texas Livestock Journal, San Antonio, Texas

mothers by a Caesarean operation.

Inheritance of "Snorter" Dwarfism

The mode of inheritance of "Snorter" dwarfism seems to be that of a one-factor Mendelian recessive. Thus cattle are of three kinds as far as dwarfism inheritance is concerned: 1) normals; 2) carriers; and 3) dwarfs.

If we let *n* represent the gene (unit of heredity) for this dwarfism and *N* represent the corresponding gene for normal development, the truly normal cattle are *NN*, the carriers are *Nn*, and the dwarfs are *nn*. Six types of matings are possible, theoretically, if we make no distinction between which is the bull and which the cow when the two are not alike in their ability to transmit dwarfism. Since a parent produces a germ cell containing only one gene of each set (in this case either *N* or *n* but not both), the offspring produced by the six types of matings are shown in the table below.

Only the first three types of matings can occur if no actual dwarfs are used for breeding. Matings of types 4, 5 —and 6 are sometimes made by experiment stations to learn more about this dwarfism but breeders need not make them. Breeders' visible troubles all come from matings of type 3, although those troubles do not occur until after some matings of type 2 have brought the dwarf gene into the herd. *NN* and *Nn* animals look so much alike that as yet we are not able surely to tell them apart by their own appearance of physiology. The fact that this type of dwarfism has increased so rapidly, however, seems to indicate that *Nn* (Carrier animals) are preferred in our selection practices even though we cannot definitely state what causes the preference.

When a dwarf calf is born to normal parents, the mating is thereby known to have been a type 3 mating and the sire and dam are equally guilty. All carriers (the *Nn* individuals) are equal in their ability to trans-

Mating type	Genotype of offspring	Outward appearance of offspring
1. *NN* to *NN*	All *NN*	All normal
2. *NN* to *Nn*	About half *NN* and half *Nn*	All normal
3. *Nn* to *Nn*	About ¼ *NN*, ½ *Nn* & ¼ *nn*	About ¼ dwarfs
4. *NN* to *nn*	All *Nn*	All normal
5. *Nn* to *nn*	About half *Nn* and half *nn*	About ½ dwarfs
6. *nn* to *nn*	All *nn*	All dwarfs

mit dwarfism. Apparent exceptions to this rule are caused only by variations in the number of mates which are *Nn* and by the chance fluctuations which can always occur in small samples. Bulls which are known as "high transmitters" are bulls that happened by chance to transmit an unusually large number of dwarf genes to the small samples of calves they produced, or who were used in a herd where the percentage of carrier cows was unusually high. If a carrier bull is used in a herd where most of the cows are *NN* and only a few are *Nn*, he won't have a chance to produce many dwarf calves. Such a bull might be known as a low transmitter. But the very same bull would appear to be a high transmitter if he were used in a herd where nearly all cows were *Nn*. In our project, a bull who has produced only 1 dwarf in 75 calves was later mated to carrier cows. Three of his next eight calves were dwarfs.

The dwarf gene is usually introduced into a herd through a carrier bull. All of his calves may appear normal because the cow herd consisted entirely of *NN* cows at the time he was used, and, therefore, all the matings were of type 2. But about half of his calves will be carriers. If the next bull is not a carrier, the breeder may never know that dwarf genes were introduced. But if the next bull is a carrier, about ⅛ of his calves from daughters of the first bull will be dwarfs. This again is an average statement and one must allow for some variation due to chance in small samples. The second bull is likely to get all the blame because no dwarfs had occurred in the herd until his calves began to come. But he could not have sired dwarfs if the *n* genes had not already been in some of the cows in the herd.

It often shows a fine command of language to say nothing.

The dwarf gene could be introduced into a herd through purchased cows instead of through a bull, of course, but each cow has so few calves that few *Nn* cows are likely to enter the herd that way unless most of the herd is assembled by purchasing females from herds where *Nn* bulls had been used exclusively.

The Problem of Dwarfism

The effect of dwarfism in a commercial herd is chiefly that of a reduction in percentage of calf crop. To the producer of seed stock, however, it is a reduction of calf crop plus a greatly reduced value of all stock for sale as breeding animals. This has caused some to dispose of all

dwarfs at birth and continue marketing of all other animals as usual, thus greatly spreading the defect.

The actual percentage of dwarfism in beef herds is unknown. Those who have had little trouble often feel it is unimportant while those who have had much trouble believe every herd is troubled with it. This has led to much confusion and many good breeders have dispersed their herds. Such action is certainly unnecessary in view of known facts about the defect. The most practical policy seems to be to recognize the defect and do all that is practical to eliminate it or make it very scarce in the animals which one has elected to breed.

Bluestone Helps Clear Scum From Ponds, Tanks

Bluestone offers a remedy to green scum forming on troughs, reservoirs or ponds. Dr. Henry S. Mosby, Virginia Polytechnic Institute, says bluestone in the right mixture, with correct precautions, will remove scum with no harmful effects on fish or livestock.

The best way to avoid scum is to put a cover or roof over water to keep out sunlight. Water protected from sunlight will not support scum, but it is not always possible to cover all water.

In using bluestone, a safe dosage is 8 pounds of bluestone per million gallons; 1 ounce per 8,000 gallons; or 1 level teaspoonful per 1,500 gallons of water. Dr. Mosby cautions that these proportions should be followed carefully.

Bluestone will lose its effectiveness in a short time and scum may grow again. If this occurs, repeat the treatment. Too much bluestone is injurious to livestock, humans or fish, and care should be taken to use only the proper amounts. Dissolve the bluestone and stir it into the trough. In treating ponds, put the easily dissolved "snow form" in a sack and drag it through the water from a boat until all of it is dissolved.

In small tanks, scum can be prevented from re-forming by placing pieces of copper sheets or shavings in the water — or empty copper cartridge cases will do. This will be effective for a long time unless the copper becomes covered with dirt and slime.

If ponds contain skin-fish such as catfish, treat one end at a time. This lets the fish escape concentrated areas near the boat. Scale fish are less sensitive. —*Virginia Extension*

Report On Pole Frame Construction

Pole frame barns and sheds have many advantages and cost less . . .

Condensed from Wood Preserving News

THE RAPID spread of pole frame construction with pressure treated poles in the last 10 years has been almost phenomenal. It can be explained only by the outstanding advantages it offers. These benefits are obvious. They include low cost, versatility, and flexibility.

Increasing popularity of the pole frame structures is dictated largely by two main factors: need for low-cost buildings within capacity of the farm to pay, and need for structures that fit economically into the mechanized operations of the modern farm.

Just as crops and farming methods vary across a large, diversified continent, so do the types of structures for which pole frame construction is used. They include beef and dairy barns, hay drier and storage sheds, corn cribs, livestock shelters and sunshades, tobacco curing barns, poultry houses, stock show and fair pavilions, and many others. The horizontal silo is also an adaptation of the pole frame building.

Low Cost Well Established

Pole frame buildings have been shown to be in the low-cost bracket by innumerable examples of cost analysis. It has been reported by those who deal with farm construction that, where labor is furnished all or in part by the farmer, the building costs usually will range from 60 cents to $1 per sq. ft. of enclosed space. If the work is done entirely by contract, the finished job may fall between 90 cents and $1.40 per sq. ft. of area, depending upon the type of building involved.

Even as pole frame design began to enter the farm field 15 years ago to spearhead the advance of lower-cost structures, so now it is appearing in the construction of urban warehouses and storage buildings. Basically, the principles of design for these are quite similar to those for farm buildings. However, warehouses are usually much larger in size.

Test of Practical Value

A test of the practical value of treated pole frame buildings occurred in 1954 during the pas-

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111 W. Washington Street, Chicago 2, Illinois

sage of Hurricane Hazel. A comprehensive survey of storm damage to farm buildings after this storm by the Agricultural Engineering Dept. of the University of Maryland reported no evidence of damage to good pole construction. An outstanding example of stability during this storm was the Baltimore Livestock Auction Market at West Friendship, Md. This 180x694-ft. building of pressure treated pole construction throughout, with an area of nearly three acres, withstood the hurricane's 100-mph. winds without damage, although many farm buildings of ordinary construction were demolished.

Pole construction is inherently low-cost because a round wood pole, as grown by Nature, comprises a strong structural unit which needs nothing except trimming, peeling, and pressure preservative treatment to make it ready for use. By comparison, comparable sawn timbers are far more expensive because of the labor and machinery costs involved in squaring the sides and in the resultant waste of unused material.

Poles are an ideal and unmatched means for cantilever support because in such work they are doing the same job which they did originally as growing trees. When alive, they carried the weight of the branches and resisted the bending of the wind. Wood poles have equal strength in all directions and great resistance to torsion. These qualities tend to minimize the effect of accidental loads or those not assumed in design.

Why Pressure Treatment?

For permanence in farm buildings and in warehouses, poles are generally pressure treated with either creosote or a 5 per cent solution of pentachlorophenol in fuel oil to a final retention of not less than 8 lb. per cu. ft. of wood in accordance with specifications of the AWPA. Poles so treated are expected to render at least 50 years of service in buildings, on the basis of service records to date.

The use of poles in building construction dates back many years and is described in detail as early as 1852 in the book on "Rural Architecture" by Lewis F. Allen. However, it is the adoption of the pressure treated pole which has transformed the old temporary type of structure into the permanent low cost pole frame building of today.

Several factors contribute materially to the increasing use of pole frame designs for farm structures and industrial storage warehouses. Bays or units in this type of construction can be arranged to fit economically into efficient farm operations or into

mechanized handling of materials.

By reason of the widespread demand for pressure treated poles from all parts of the country, the American Wood Preservers' Assn. has prepared pressure treating specifications for nine of the more important species. These include Southern yellow pine, which is the dominant tree of the South; Pacific Coast Douglas fir; western larch and ponderosa pine in the Northwest; lodgepole pine in the Rocky Mountain area; and jack and red pine in the North. All of these can be pressure treated with preservatives by plants located within the regions of their growth or can be processed in transit by other plants between their points of origin and their markets.

Where to Get Plans

Standard plans for the usual farm and industrial structures are available from many sources: the extension agricultural engineering departments of many state colleges; the Doane Agricultural Service, Inc., St. Louis, Mo.; the Reynolds Farm Institute, Louisville, Ky.; Aluminum Co. of America, Pittsburg, Pa., and others.

It is customary in warehouse construction to place the floor or ground surfacing on the area first. This enables the builder to do this part of the work in the open with road paving equipment, quickly and at low cost. Small openings in the floor can be left at that time for placing the poles, or holes can be cut through the floor later. In the case of a concrete floor, the first method usually applies, and the second procedure may be followed for a bituminous mat floor.

Expensive foundations are not required. The pole columns, set usually about 4 ft. in the earth, provide ample support for the light-weight roof and walls of the building. Floor loads are supported directly on the ground independently of the frame.

After the site is leveled, the holes are bored at proper spacing for setting the pole uprights or columns. The size of the holes should be sufficient to permit pole butts to be shifted so that good alignment can be obtained along the outer surface of these uprights at the ground-line.

Because 14 and 16-ft. lengths of 2-in. plank are common items in yard lumber stocks, poles for buildings where interior columns are permissible are spaced usually on 13 or 15-ft. centers. This spacing permits sufficient lap at the column for nailing girts securely. Plank about 1 ft. longer than the slope distance along the roof between the poles are used for rafters. Cutting or framing the lumber is required only for

the plates along the outer wall lines that support the ends of the rafters. These plates, generally 2x10-inch plank, are butt-joined at each pole. Spacing of the horizontal girts depends on the strength of the siding or sheathing. A spacing of 2½ ft. is generally satisfactory for most sheet or corrugated metal sidings.

A somewhat wider spacing can be used for plank sheathing. The rafters, except those at the ends of the building, are simply lapped together. End rafters must be framed to fit the roof pitch as these must be kept in the same plane to permit an even gable wall. All other rafters are lapped at the ridge and at splices which occur over one of the pole lines.

The shearing resistance of the earth to the overturning of a pole varies directly with the square of the depth of set. In general, for low buildings, it is considered good practice to embed poles at least 4 ft. deep in good soil and 5 ft. deep in soil of medium supporting quality. In the case of 35 to 40-ft. poles, a depth of 6 ft. is recommended.

Holes can be bored to any required depth with utility line equipment. However, the usual depth of boring holes with post hole diggers attached to farm tractors, is now limited to about 3½ feet. If it is not possible to go to the full recommended depth of embedment by hand digging or other means, additional resistance to angular displacement can be obtained by pouring concrete into the hole around the pole. To achieve worthwhile results, however, the concrete encasement should double or preferably triple the diameter of the pole in such cases.

Selection of Poles

The minimum top diameter for building poles should not be less than 5 or 6 in. These are the sizes most popular in farm buildings designed by agricultural engineers and architects. Smaller poles do not provide sufficient area upon which to obtain secure bearing and attachment of roof loads. In the case of long spans designed for clearance and of heavy roof loads on trusses, 7 or 8 in. top diameter poles frequently are specified.

Some friends are like your shadow — you see them only when the sun shines.

It is not wise to utilize second-hand poles for the construction of permanent buildings. Used poles obtainable today from the salvage dumps of utility companies usually have served for a good many years already. From the standpoint of economy in annual costs, it is far better to install newly pressure treated poles in buildings.

New Vernal Boosts Alfalfa's Stock

This new variety offers high yields and persistence. It withstands frequent cutting or grazing and fits flexible management . . .

Reprinted from Iowa Farm Science

C. P. Wilsie and *H. Douglas Gross,*
Iowa State College

VERNAL ALFALFA is a new variety likely to become well known. About 5 million pounds of certified seed are now available at prices only slightly above those of Ranger and other standard varieties.

It's expected that Vernal will be used extensively in the north-central states in the next few years. Tests at the Iowa Agricultural Experiment Station have indicated that Vernal offers promise of both high yields and persistence under Iowa conditions.

Vernal was developed by the Wisconsin Agricultural Experiment Station and the USDA. It was officially released in 1953. Nearly all of the seed produced that year was planted for seed increase in 1954—much of it in west coast areas where large seed yields are possible under irrigation.

Additional acreages for seed increase were established in 1954. High yields during the last 2 years have provided sufficient seed for extensive use of this new variety in midwestern and eastern states.

Vernal is a synthetic variety, developed over a period of years by breeding and selection for winterhardiness and resistance to bacterial wilt. Approximately half of its parentage traces to selections from the Cossack variety, obtained originally as scattered survivors in an old alfalfa field. The other half of its parentage includes selections from three varieties: a wild, yellow-flowered alfalfa, *Medicago falcata, and* two cultivated varieties, Ladak and Kansas Common.

Under Wisconsin conditions, Vernal has produced forage yields superior to those of Ranger. It has also shown greater survival in alfalfa-grass mixtures grazed intensively.

We first planted Vernal alfalfa at the Agronomy Farm at

Reprinted by permission from Iowa Farm Science, Ames, Iowa

Ames, Iowa in April 1949. At that time, it was designated "Wisconsin Synthetic G" and was included in a yield trial along with 48 other varieties and strains. All plots were harvested for forage yields three times each year for 4 successive crop years. In this trial, Vernal outyielded Ranger by 12 per cent and Grimm by 24 per cent.

Additional trials were established in 1952 and 1953. A summary of yields obtained in the first 2 crop years for several varieties in each of four experimental trials is shown in the table. These data indicate that Vernal produced the highest yields of forage, with Buffalo as a close second. On the average, Vernal outyielded Ranger by 7 per cent and Grimm by 15 per cent.

Cutting Frequency . . .

In 1953 we established a field trial which included different cutting systems. In addition to the regular method of harvesting three times each year for hay, a second system involving frequent cutting was used. Plots under "frequent cutting" were clipped close to the ground whenever the average plant height reached 8 inches. This drastic cutting treatment was used to stimulate the effects of overgrazing and particularly to determine if there were any marked varietal differences in ability to withstand cutting five or six times a year.

All cuttings were discontinued by Sept. 10 of each year. This allows the plants to build up root reserves needed for satisfactory winter survival.

A USDA survey shows that Northeastern family size dairy farms averaged one-fourth larger net farm income in 1955 than in 1950.

In this trial, Vernal was outstanding in performance — both when cut for hay and when cut frequently. This would appear to be an important point when choosing a variety.

The flexibility in possible management offered by Vernal should go far toward further extending the acreage and use of alfalfa. For hay—grown either alone or with brome, orchardgrass or timothy—and for pasture in grass-legume mixtures, Vernal may be expected to produce excellent results.

Special Features . . .

Vernal was developed from highly winterhardy stock and shows a fairly early fall dormancy. In recovery after cutting, Vernal is not as rapid as Buffalo but somewhat more rapid than Ladak.

In appearance, Vernal has a

darker green color than Ranger. Also, it seems to retain its green color better under unfavorable conditions often caused by infestations of leafhoppers and leaf diseases.

When in bloom, Vernal is strikingly different from other varieties. Flower color is highly variegated—including all shades of purple, blue, green, bronze and yellow. This characteristic is an aid in identifying the variety during the blooming period.

Forage Yields of Vernal Alfalfa and Several Standard Varieties in Four Experiments, Ames, Iowa, 1950 - 55.

	Tons of dry matter per acre per year for 2 crop years				
Variety	Field A 1950-51	Field B 1953-54	Field C 1954-55	Field D 1954-55	Average yield in four trials
Vernal	2.87	3.35	4.81	4.60	3.91
Buffalo	2.66	3.49	4.59	4.52	3.82
Atlantic	2.63	3.44	4.37	4.39	3.71
Ranger	2.35	3.37	4.44	4.42	3.65
Ladak	2.59	3.30	4.32	4.17	3.60
Grimm	2.45	2.97	4.15	4.24	3.45

Going Hungry May Not Hurt Calves

Feeding calves for rapid growth can be done when it is economically feasible, and gains can be stopped and started again if the situation warrants it, according to U. S. Department of Agriculture research.

USDA researchers worked with 10 pairs of identical twin calves. Between the ages of three and six months, some were given a submaintenance ration, providing about 75 per cent of the energy necessary to maintain body weight. At the end of a four-month period, these stunted animals were fattened along with the twin mates which had been fed liberally from the beginning.

The lowered rate of gain did not harm the animal's feed efficiency during the subsequent feeding period or the quality of the carcass at slaughter. The calves that were behind gained 7 per cent faster on full feed than their twin mates. The average amount of total digestible nutrients per pound of gain was almost the same for both groups. —*Virginia Polytechnic Institute*

Fairfield County Stages a Comeback

Conservation has produced remarkable changes in a South Carolina county once used as a historic "bad example . . ."

Condensed from Soil Conservation

Henry F. Cauthen

FAIRFIELD County, S. C., is a land of almost revolutionary transformation, and the change — all of it for the better — is still in process — spreading over the hills and through the valleys.

It can all be defined by three words beginning with the letter "P"—Pines, Pastures, and Ponds. From this triumvirate has come a condition described by another word beginning with "P"—Prosperity.

A day spent driving over Fairfield can be a day of gratification — even for the man who is not a farmer.

When the antebellum plantation system went out in Fairfield, and later when cotton declined, lands were deserted and tragic erosion set in. Indeed, the county became famous for its gullies and the disappearance of its topsoil.

Today, men can look with satisfaction to a Fairfield that still shows many of the scars and other evidences of erosion, but that also has thousands of acres of rolling pastures, which feed beef and dairy cattle and grip the hillsides and defy erosion. And where pasture grass isn't protecting the sloping lands, terracing and other modern soil practices advocated by men of the Soil Conservation Service is "catching" and holding the land.

Any day in Winnsboro a common sight is truck after truck loaded with pulpwood and heading for the big woodyards.

From the sale of its pine Fairfield is deriving a revenue of more than a million dollars a year. The dollar mark is now on the pine tree. Men here have seen it pay off. They know it will continue to pay off, and they are cutting the trees scientifically. They are planting seedlings, too.

Leaders in Fairfield County give full and warranted credit to two groups for what has happened here in the last 20 years —the men of the Soil Conserva-

Reprinted from Soil Conservation, Washington, D. C.

tion Service, with their know-how, and the men of the big paper companies which buy the pulpwood.

There are 447,000 acres of land in Fairfield County. More than 300,000 acres are in woodlands. It is estimated that about 308,000 cords of pulpwood were cut and sold in the county last year, with the proceeds exceeding a million dollars.

Under the impact of this, land values have of course gone up. A minimum of $50 an acre is being paid for cutover woodlands. Good pasture land (if you can buy it) runs much higher. The Fairfield farmer, bolstered by the continuing demand for pine, and confident in his know-how in both fields, is not worried about the future—and the commerce and general economy of the entire county reflects his healthy condition.

You can stand on a high point on Dave Crawford's cattle farm and see almost 500 acres of pasture, broken only by ponds and undulations of the land.

Fairfield's economy is now one of beef cattle, dairying, and pulpwood. Thousands of acres of its once severely eroded lands have been reclaimed for cattle farms. On some graze Fairfield's dairy cattle, and on the others, breeds of beef cattle.

Almost every inch of Mr. Crawford's farm is covered with grass. At the bottom of some of the slopes are the clear-water ponds which provide water for his cattle. The water is entirely surface water that flows down to the ponds from the grassed slopes.

All over Fairfield today are fine pastures. There are 27 Grade-A dairies in the county. With the able assistance of the men of the Soil Conservation Service, the dairy farmers have excellent programs to maintain good pastures and to grow feed for winter feeding.

Good pastures must have water for the cattle and there are now 339 ponds in Fairfield County. SCS men helped design 99 ponds in 1955. This indicates ponds are being provided at a higher rate per year than ever before.

Since the depression of the late 1920's and early 1930's, Fairfield has been virtually made over agriculturally. Cotton production has dropped from an average in those years of about 30,000 acres a year to 5,000 acres in 1955.

In 1955, it is estimated that Fairfield's income from agriculture was as follows:

Pulpwood	$1,000,000
Dairying	800,000
Cotton	750,000
Beef cattle	600,000
Turkeys	250,000

This comes to 3.4 million and

does not include miscellaneous income from the sale of hay and grain and other crops. It shows, however, the principal sources of the healthy farm income of the farmers today.

All over the county there has been improvement and the improvement is continuing. There probably is not a better example in the State, of men accepting new farm concepts, going to work on them, and making them succeed.

You can see the effects not only on the lands, but in the houses and barns.

And the Merchants and Planters Bank reflects it impressively. As late as 1937, the resources of that bank stood at approximately $750,000. Today its total resources are more than $3¼ million. There it is — in cold figures — the best evidence of a great agricultural transformation.

How Hay Quality Varies With Cutting Time

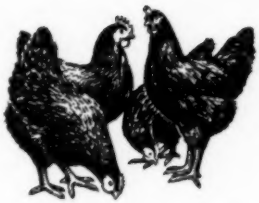
Recent experiments show that farmers and ranchers can increase the protein content of hay by as much as 10 per cent if the hay is cut at the proper time.

According to L. J. Kortan, assistant animal husbandman, regular cuttings of hay were made in July, August and September in tests in Nebraska. Crude protein content of the July cutting was 7.1 per cent; August, 5.7 per cent and September, 4.0 per cent. This meant that July hay fed without a protein supplement produced as much gain as September cut hay fed with one-half pound of supplement.

Kortan said that a ton of hay at the blooming stage has 268 pounds of protein. That same ton of hay cut in the fall would have only 78 pounds of protein.

South Dakota experiments proved the same to be true. Early-cut hay at two sub-stations averaged 49 pounds of protein per acre more than late matured hay. "It would require 150 pounds of 40 per cent protein supplement to make up the difference in an acre of late hay," Kortan said. "At a cost of five cents per pound this means a loss of aproximately $7.50 worth of protein in each acre of late cut hay. —*South Dakota State College*

Billions of Broilers



Poultry raisers' production line methods rival those of industry . . .

Condensed from Chemurgic Digest

APPLICATION of research to poultry production has brought striking changes at every step — from the hen house to the dining table. Most dramatic has been the growth of the broiler industry — from a farm fringe operation with an output of 43 million birds in 1935 to a full-time commercial enterprise with an annual production of more than a billion broilers today.

The oven-ready broiler sold to the housewife is produced on a scale and by methods that approach — in precision and complexity — those used in the manufacture of electrical appliances. This has been achieved through:

(1) *Breeding research* to develop hardy, fast-growing birds that make efficient use of modern feeds. Improved White Rock strains and crosses, Delaware crosses, and Cornish crosses (including the new Beltsville Broiler) are beginning to replace the first of the crossbred lines — Red Rocks and Barred Cross — that introduced hybrid vigor into broiler production. USDA's Beltsville Broiler comes from a cross between the Silver Cornish and New Hampshire lines. It grows from a chick to a three-pound broiler in 10 weeks, has good conformation, and is light in color and easy to dress.

(2) *Nutrition studies* to develop high efficiency feeds. The standard feeds of 1935 — chiefly milk and meat meal, with vitamins A and D added — have been replaced with more efficient and less expensive feeds. These are chiefly corn and soybean meal. To these are added vitamin B^{12} products and antibiotics to promote growth, arsenicals to enhance yellow coloring in the skin, and animal fats to improve feed efficiency and processing. The improvements can be measured in terms of pounds of feed per pound of broiler. In the past 20 years this

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has been reduced from 4.0 to 2.6 under good commercial conditions.

(3) *Research to control disease* that made broiler production costly in 1935. Among these is pullorum, a disease that once threatened to put hatcheries out of business. It has been brought under control through measures that detect pullorum carriers. Vaccines have been developed for infectious bronchitis and Newcastle disease. Sanitary measures now reduce the spread of two other serious diseases — coccidiosis and chronic respiratory disease.

(4) *Better understanding of environmental needs,* and advances in engineering that have led to improved broiler houses and efficient automatic equipment. Good management, modern strains of birds, and up-to-date feeds have increased production efficiency by 162 per cent. Today, one man cares for 2.5 times as many birds as in 1935.

(5) *Research in marketing* to move high-quality broilers rapidly from farm to consumer. This has led to the establishment of slaughter plants in broiler production areas; to marked improvements in plant equipment and handling practices; to new methods of freezing; and to drastic changes in marketing methods. Most broilers were sold as live birds in 1935. Today, they go to market dressed and ready for the pan. The individual bird, packaged in plastic film, is sold at prices competitive with other meats.

Steady gains have also been made in egg production per layer. Today's hen produces an average of 15 dozen eggs a year, compared with 10 dozen per layer 20 years ago.

Studies in nutrition showing the importance of protein in human diets have helped to boost consumption of both poultry meat and eggs. The people of this country are eating two-thirds more poultry meat and one-third more eggs per capita than in 1935.

Four out of five farmers today still keep chickens. Poultry and eggs are the third ranking source of income, surpassed only by meat animals and dairy products. On the average, about $1 in every $10 earned by farmers throughout the country comes from chickens and eggs.

USDA's Agricultural Research Service says that growers can look forward to broilers that reach 3 pounds average weight in 7 weeks and require only 2 pounds of feed per broiler. Layers that produce a hen-house average of 225 eggs a year — 25 per cent more than today's average — are on the research horizon .

Helping Young Farmers To Help Themselves

Condensed from Plant Food Review

Frank Atwood

A Radio Station Carries On Prize-Winning Youth Program

Radio Station WTIC, Hartford, Connecticut, has developed a unique farm youth program to encourage boys and girls who show an aptitude for livestock farming to start building up their own herds with good foundation stock.

The mechanism, a revolving loan fund, could be adopted by almost any type of organization interested in helping young farmers to get started, and could be adapted to almost any kind of project.

As a result of its program, WTIC recently was honored by the Thomas Alva Edison Foundation with an award as "the radio station that best served youth in 1955." The award included a $1,000 scholarship which will help some high school senior in WTIC's listening area to start college next fall.

The award was the first of its kind and the only one presented to a radio station. A similar award went to one television station, WBNS-TV, Columbus, Ohio.

Six WTIC programs and projects serving youth were reviewed by the judges, but in presenting the award to the station, the Honorable Charles Edison, former Governor of New Jersey and son of the inventor, gave special mention to the Farm Youth Program.

TOM MOORE of Portland, Connecticut, decided when he was in the eighth grade that he wanted to be a dairy farmer. Now, largely through the help of a unique loan program operated by a Hartford radio station, Tom has achieved his goal the first year out of high school. He has a herd of 23 dairy animals, in-

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National Plant Food Institute, 1700 K Street N.W., Washington, D. C.

cluding heifers and small calves, and a contract with the Connecticut Milk Producers' Association under which he is shipping five cans of milk a day.

This is still a small operation, as dairy farms go, but Tom has just had his nineteenth birthday. He owns a tractor with mower, rake, plow and harrow, a pick-up truck, a hay baler, a manure spreader, a milking machine and a milk cooler. He cut 2,000 bales of hay last summer and filled a silo with soybean and corn silage for his cows. Having come this far in five years, he has plans for a larger herd, a new barn and, some day, a farm of his own.

Tom's first heifer calf, and the first animal he had ever owned, was a Holstein purchased with a loan from the $25,000 revolving fund of the WTIC Farm Youth Program. She was Rollinridge Ormsby Sally, one month old, from the registered Holstein herd of Peter Bahre in Suffield, Connecticut.

The calf had been selected by Tom with the advice of a Holstein breeder, Walter Thorp, who serves on an Advisory Committee for the Farm Youth Program. Mr. Thorp had approved both the heifer's breeding, with special attention to milk production records of her dam, and the price as being fair both to the boy and Mr. Bahre.

Tom signed a note for $125 with no interest charges. He also signed a contract which made him a legal partner of the Travelors Broadcasting Service Corporation (WTIC) in the ownership of the little heifer until she was two and a half years old and safely bred for her first calf. If the heifer had failed to breed or had been lost through accident or disease, the loan would have been canceled. WTIC doesn't want its young partners paying for "dead cows," and this insurance protection is a safe-guard against a loss that might be disastrous to a beginning livestock man.

All went well with Sally, however, and she had her first calf, a heifer, right on schedule. A year later she had a second heifer calf and the next year a third one. This was remarkable luck, of course, but the result is that Tom now has three daughters of his original foundation animal and one of her granddaughters in his herd.

In the meantime, as soon as he had repaid his loan, Tom became eligible to borrow again from the WTIC Farm Youth Fund, and this time he bid on a calf at a state-wide auction, held annually at the University of Connecticut for all dairy breeds, where bidding is limited to 4-H Club members and Future Farmers under 21. He happened to pay exactly the same

price, $125, for a six-weeks-old Holstein calf from the purebred herd at Long Lane Farm, Middletown, one of the State's correctional institutions. Her name is Lessenden Maurauder Mona Patty, and she is milking now with her first calf. This one turned out to be a bull.

Again Tom paid up his loan when it was due, and full ownership of Patty was transferred to his name.

Starting high school, Tom had enrolled in the vocational agriculture course, and the agriculture instructor at Middletown High School, Philip Masley, was his advisor on farm plans and operations. Tom learned the importance of keeping records, and he can tell to the fraction of a pound how much milk and butterfat each of his cows has produced and to the penny how much return he gets over feed cost for each one. He has filled out his herd temporarily with purchases of grade cows until he can convert entirely to purebreds, and he has worked away from home driving a truck and doing custom baling to have extra cash to build up his farm business faster.

Tom is a big boy, six feet, five inches tall, and weighing 230 pounds. One of the principal reasons for his rapid progress has obviously been his own ability and willingness to work hard. Another reason is the enthusiastic help he has from his father, Gordon Moore. Still another is the opportunity to use land which his family does not own. Tom's father is caretaker on a large estate owned by Murray Taylor, New York corporation lawyer. Mr. Taylor has been delighted to have Tom make use of the barn and the fields and pastures, which were "running down."

Mr. Taylor's compensation comes from Tom's work in bringing back the productiveness of the land by fertilizing and reseeding and in keeping up the farm's appearance by harvesting the hay and trimming out the fence rows. Tom has had advice on fertilizer applications from a nearby fertilizer manufacturing firm. He has used the manure from his own herd, of course, and made a deal with a neighboring Future Farmer in the chicken business to get the poultry manure from his farm. As a supplement he makes effective use of an 0-15-30 mixture for his forage seedings.

In addition to 50 acres of the Taylor estate, Tom has arrangements to cut hay on four other nearby places which once were farms but are now owned by people who are not farmers. Two of these are rent-free and the others are on a nominal rental basis. In this southern New England area where many small

farms have become strictly residential property, there are similar opportunities open to other young would-be farmers.

The WTIC Farm Youth Program was developed with the thought that boys and girls who show an aptitude for livestock farming should be encouraged to start building up their own herds with good foundation animals. With even a small herd in production and paying its own way, a boy is in a better position when he finishes school to take on a rented farm with hope of making it a success.

Another longer-range objective of the Farm Youth Program was to improve the quality of livestock herds by insisting on high standards of milk production.

Since 1948, when the program was started, WTIC has purchased 396 heifer calves of six dairy and two beef breeds, for 325 boys and girls in Connecticut and western Massachusetts. Some of the boys and girls have come back for second and third loans. Some have dropped out of the project, naturally, as their interests have changed or their families have moved away, but many have continued, as Tom Moore has done, with the establishment of a good small herd.

Practical farmers, chosen by the purebred cattle associations, serve with vocational agriculture teachers and Extension staff members on advisory committees for the Farm Youth Program in each state. Individual members of the committees consult with the borrowers all year 'round to help them choose good calves and to see that they receive good care.

On most farms it will pay to cull, as unprofitable, cows of the higher testing breeds that produce less than 5,000 pounds of milk a year and cows of the lower testing breeds that produce less than 7,500 pounds.

Each spring WTIC is host at an all-day outing and hamburger roast at the station's transmitter grounds near Hartford, attended by the young people and many of their parents. Each fall three outstanding junior farmers who have been borrowers from the Farm Youth Fund are chosen for trips out of state with all expenses paid by WTIC, two to the National 4-H Club Congress at Chicago and one to the national convention of the Future Farmers of America at Kansas City.

Tom Moore, who was chosen Connecticut State Star Farmer in 1954, went to the FFA convention that fall on the WTIC Farm Youth trip.

"One thing I'll never forget," Tom wrote, "was my trip to Kansas City."

A 1,000 Ton Silo for $1,696

Facts and figures on trench silos and what they can do for you . . .

Condensed from New Jersey Farm and Garden

Jim Ferguson

IF YOU ARE a dairyman who has to count pennies and needs more silage capacity, Walter Zimmerer, Jr., of Big Brook Farm at Holmdel, New Jersey, thinks he has some ideas you can use.

He has a purebred Angus and Hereford herd, 200 of which are mature animals, some of which are fitted for show — yet he feeds them in one hour a day with one man and a boy handling all of his farm operation. This includes 100 head of young stock.

"If I weren't in the show circuit, I'd do it with one man," he says. "What's more, I get my storage for one-fifth of the cost of an upright silo per ton of capacity."

Summer before last he completed a new concrete trench silo. It cost him exactly $1,696.50. It holds 1,000 tons—which works out to $1.70 a ton, or 17 cents a ton a year on a 10-year basis. Here's how that breaks down:

- $100 for bulldozer and man for excavation for one day for the trench, which is 100 feet long, 16 feet wide at the bottom, 23 feet across at the top, with side walls 16 feet high—36,000 cubic feet in all.
- $50 for bulldozer and man to set slabs, which took a half day.
- $150 for hand labor to finish sides, build forms (100 hours at $1.50 an hour).
- $316.50 for reinforcing rod.
- $1,080 for 90 yards of ready-mix concrete.

He has just finished feeding out another trench silo which had some three-year-old stuff in it . . . and "the cattle went for it like honey."

When he checked the new silo, the silage was in excellent condition. Part of it was heavy alfalfa-grass mixture, treated with sodium bisulfite just before chopping, and packed down with a crawler tractor. The rest apple pomace, so heavy it needs no

Condensed from New Jersey Farm and Garden,
Sea Isle City, New Jersey

packing.

He's so sold on the idea he's going to build a third trench silo this summer.

Here's an important provision of the Social Security law. If you become disabled and cannot continue working, you should get in touch with the nearest Social Security office. If you have had regular work under Social Security, it may be possible to place a "freezer" on your own record so that the years when you could not work, because of your disability, will not count against you when you reach retirement age.

"I figure I can get five times the storage capacity for less then the cost of the cheapest 200-ton upright silo," he says.

How about spoilage? You get six to eight inches at the top, but "it isn't worth the effort" to cover the trench. He builds a mound 4½ feet above ground level to help shed water, sprinkles spoiled hay over it for added protection.

"The big secret," he says, "is to get the silo on high ground, well drained, and pitched so that no matter how hard it rains the water doesn't pool in the bottom of the end you're feeding from, but drains right off."

Zimmerer uses a front-end loader to take out silage, putting it in a self-unloading forage box. He drives to any of his five feeding stations, along all-weather roads, and augers it out in bunkers.

"Maybe this isn't the setup for the stanchion barn, but it would be perfect for a loose-housing setup," he declares. "The cows could eat their way into the pile, since the floor is cement, and you'd scrape away the manure once in awhile. Or you could pick it up the way we do and throw into mangers in the feeding lot adjoining the shed."

He completes a once-a-day feeding of 200 head of mature stock in one hour, including loading time.

Zimmerer has an unusual way of treating his silage, too. He feeds the bisulfite onto the silage in the throat of the harvester before it is chopped. A converted fertilizer drill does the trick. It is geared to the wheel of the harvester so that it distributes the preservative only when the harvester is in motion. Says he gets a thorough mix that way.

"Pack it down tight," he says. "That's the most important thing. When you open it up, it'll be as good as anything you've ever put up."

The Calf's The Crop

Calving time is an important time to the operator of a beef herd. Here lies his profits . . .

Condensed from Hereford Journal

Luther Miller

SOMETIME ago I was talking with one of our prominent Hereford breeders shortly after he had what I thought was a very successful sale, one which averaged well over $1,000. During the course of our conversation the breeder commented that he barely broke even after figuring his production cost.

Later I learned that he was enjoying only about a 40-per cent calf crop from nearly 200 cows. It then became clear to me why his production cost was so high. The beef cattle business is just like any other business in that the production cost has to be kept at a reasonable minimum to enjoy good profits. The most important factor in lowering production is to get good calf crops year after year.

What Is A Calf Crop?

The calf crop is the percentage of calves weaned from the total number of females in the herd of breeding age. If there were 100 cows of breeding age in the herd, and 15 months from the time the last cow was bred there were 85 calves weaned, this would mean that the herd produced an 85-per cent calf crop.

It is very misleading to figure the calf crop on the number of calves born against the number of calves weaned, for this does not take into account the cows which are non-breeders, cull outs for various reasons, or abortions. Most commercial operators figure that they have to get a 75-per cent calf crop before they can show a profit. Hardly without exception one will find that the non-profit-making operator is the victim of poor calf crops.

There are several factors which contribute to a poor calf crop, over some of which man has no control. In some areas violent storms play a major role in lowering the calf crop. In the past, brucellosis has taken a heavy toll, but thanks to veterinary science, that has been brought under control. For the most part the calf crop is in direct proportion to the care given the bulls, the

Reprinted by permission from Hereford Journal, Kansas City, Missouri

brood cows, and the calves immediately after they are born.

The last 60 to 70 days of the gestation period are the most important as far as care is concerned. This is the period when the fetus goes through the greatest development; consequently this is also the time when there is the most stress on the cow's body. It is at this time that the cow's mineral, vitamin (particularly A and D), and protein intake should be carefully considered.

The ideal condition is for the herd to be on green pasture 60 to 70 days prior to calving. Very rarely does it happen that green pasture will not supply all the necessary vitamins, minerals and proteins. However, in most instances the cow herd is still being maintained on winter rations during this critical period just before the spring calves start arriving.

The operator should acquaint himself with the nutritional value of the roughages he wishes to use during the winter feeding period, and if necessary supplement any deficiency that may occur, thus properly preparing the cow for calving.

A mineral deficiency is the most prevalent and this can be very easily overcome in most cases by merely supplying the herd with a good commercial mineral mixture; or, often times a simple mixture of equal parts of salt, feeding limestone, and sterilized bone meal fed free choice will take care of any existing mineral deficiency. Calcium and phosphorus are essential for the development of strong, vigorous calves. If the soil which is producing the feed for the cow herd is deficient in these two elements, it will have a definite bearing on the calf crop.

Calves from the cows getting a calcium- and phosphorus-deficient feed will be weak at birth, and if they live will be very poor-doing calves for some time. A mineral-deficient cow will usually have a retained placenta, be a poor milker and condition herself slowly for her next calf. In extreme cases it is necessary to force feed a mineral mixture by mixing it in a grain ration or feeding a range cube which is heavily mineralized.

During the 60 to 70 days prior to calving the herd should have access to the best possible roughage. Most green hays and grass silages will supply sufficient amounts of vitamins A and D and the necessary proteins. If no good green roughage is available, the vitamins A and D should be supplied either in some form of a protein supplement or mineral mixture. There are a number of commercial protein supplements on the market which

can be secured at a low cost per cow.

Plenty of Exercise Essential

A cow which is seven to eight months along in her gestation period should get plenty of exercise. This helps to keep the muscles in good tone, which is essential for parturition, and helps keep the blood circulating. Good blood circulation helps to develop a strong fetus. If the herd is on pasture or being fed on range there is very little to worry about in this respect. In the main, the herd should never be confined to small feedlots or paddocks just prior to calving for this will have a tendency to make the cows listless and lazy.

A University of Illinois agronomist believes that even with today's heavy fertilizer applications farmers in general are still not replacing the plant food taken out each year by intensive land use.

As the calving date draws near and the cows begin to show apparent signs of calving, which is demonstrated by filling of the udder, relaxed muscles of the rump and enlargement of the vulva, the herd should be under constant watch. In the winter months, it is desirable if possible to keep the herd fairly close to barns or sheds in order that a cow ready for parturition can be quietly driven to a calving stall in just a few minutes. In the spring and summer the heavy cows should be kept in small pastures with a calving corral close at hand.

Pasture Perfect for Calving

There is no better place for a cow to calve than in the pasture, and, weather conditions permitting, this is where the herd should be left for calving. However, if a cow has to be confined to a stall, it should have plenty of clean, dry bedding in it.

When the first signs of parturition appear the cow should be handled gently and kept as quiet as possible. At this period, most cows have a tendency to become nervous and become very easily upset. Oftentimes if a cow is given a liberal feed of good hay it will help to quiet her.

If the cow is making satisfactory progress toward calving, she should be left alone. However, if labor appears to be difficult with no progress indicated, some assistance should be given. This is a very critical moment for the calf, and just a little help will often mean the difference between a living calf and a dead one. If it becomes apparent that the cow cannot calve without considerable help, a veterinarian should be called at once. Caesarian sections are becoming very

common and are quite successful if performed before the cow exhausts herself in trying to calve, or starts developing a fever.

Immediately after the calf is born a good antiseptic or healing agent should be applied to the calf's navel cord. This will help prevent infection entering the body through that opening and will facilitate its healing. The new-born calf should be up and trying to nurse within about an hour, and if it has not made any effort to nurse within this time, it should be helped to nurse or force-fed some of its mother's milk with a dose syringe. If the latter method is necessary, the syringe and milk container should be clean and sterile if possible, and the milk should be given to the calf very slowly.

Bird in the Hand

The "revenooer" stuck his head into a mountain shack. "Where's your paw?" he said to the pretty daughter who greeted him.

"Up at the still."

"Where's your maw?"

"Up t' the still."

"I'll give you a dollar if you'll take me to the still."

"Okay, give me the dollar."

"I'll give it to you when we get back."

"No. I'll have to have it now. You ain't likely to come back."—The Furrow.

Most cows will shed their placenta within a few minutes after calving; however, it is not uncommon for a cow now and then to go several hours. If the cow has not cleaned within 24 to 36 hours, some inducive medication should be given by a veterinarian to hasten the cleaning process. This is very important, for a cow that is slow to clean is usually hard to settle for her next calf.

Frequent Udder-Check Desired

The cow's udder should be checked frequently for sore or chapped teats and congestion. In the case of spring calves the cow's teats may sun- or wind-burn, and in the winter they frequently crack, becoming very sore. In either case, the teats should be treated regularly with petroleum jelly or a mild skin ointment. Avoid those containing camphor, for these will discourage the calf from nursing.

A roomy creep should be provided in order that the calves, as soon as they are interested, may have access to a grain mixture and not be disturbed while eating by the older cattle. A pasture creep should be located in the shade close to water where the herd congregates regularly, and in extremely large pastures two or more creeps may be needed. For fall and winter

calves —a sheltered creep should be provided. It is especially important that this shelter be free from drafts and that the bedding be kept clean and dry. A creep ration of 4 parts oats and 1 part cracked corn will keep the calves growing in good thrifty condition. A protein supplement might be used if the cows are not milking too well.

If evidence of scours develops among the calves, it should be determined immediately whether the ailment is nutritional or contagious. The antibiotics are very effective against contagious scours, and in the case of nutritional scours the creep ration should be adjusted to properly supplement the pasture or the hay.

There is no time during the year that a good cow man can relax. He should constantly be on the alert, tending to the many details that eventually will contribute to a good calf crop. After the cow has had her calf she not only has to nurse it until it is six to seven months old, but also has to be bred within the next three months to produce a calf in another year.

The brood cow is no more than a machine in a factory; consequently if she is not operating efficiently the balance sheet for the whole herd will be affected. There are basic figures to prove that if a commercial cow loses one calf she will have to produce 10 other calves in her lifetime to be profitable.

Sheep, Bright Spot in Farm Outlook

Outlook for sheep and lambs appears fairly good for the next 4 or 5 years. That's because the sheep population remains at a low level—little more than half that of the late 1930's and early 1940's. The wool support program gives sheep and lambs another advantage for the next few years. Under this program, wool prices will be supported at an average level of 62 cents per pound. The wool payment each grower received on his 1955 clip was about 41 per cent of the amount he received on the market for the clip.

Sheep and lamb prices have been affected by the low prices for cattle. The scarcity of lambs, however, has held their price drop during 1955 to less than half the price drop for cattle.

—Washington Farm and Home

Johnson Grass Can Be Controlled

A stubborn, noxious weed, Johnson Grass has caused good land to be abandoned. Control is not easy . . .

Condensed from Kentucky Farmer

IN KENTUCKY, agricultural officials view with alarm "the ever widening encroachment of Johnson grass" over many of the state's production acres.

Thousands of acres of fertile bottomland have all but been abandoned to the perennial noxious weed. Other fields are so heavily infested with Johnson grass as to be practically worthless for growing row crops.

If it is caught and recognized in time, it can be stopped. And if it already has gotten a strong foot hold, it can be controlled.

The important thing, is to recognize it when it appears, and then do something about it.

Johnson grass is a sorghum which closely resembles sudan grass. The average height of mature plants is about 6 feet. The stems are about the size of a pencil and leaves are ½ to ¾ inches wide with a light green-colored midrib. It usually grows in bunches and forms seed heads which are branched and have a reddish appearance when mature.

When it first appears on the farm it can be dug up or spot treated with chemicals. It spreads both by seed and underground rootstocks.

Seeds usually mature in July or a little later in the summer. Birds, livestock, wind or drainage water can spread it to adjacent fields.

Usually three close cuttings a year, each time the plants put out flower heads, will prevent seed production.

And this is true for roadsides and ditch banks, fence rows and waste lands as well as in fields and pastures.

Because Johnson grass can be spread from pieces of roots extra precautions should be taken when working in cultivated fields. The plow should be raised over infested areas. Disk harrows can be used without danger of spreading the rootstocks but spike tooth harrows and drags will move pieces of the rootstock to clean soil and thus spread the infestation. Crop seed should be free from Johnson grass seed, and straw or hay from infested fields should not be brought to clean fields. Machinery which can col-

Reprinted by permission from Kentucky Farmer, Middleton, Kentucky

lect seed should be thoroughly cleaned.

Besides grubbing out rootstocks to eradicate small patches and frequent cutting to control seed production, the weed can be eliminated with soil-sterilizing chemicals after the plants have been cut and removed.

Both sodium chlorate and sodium trichloracetate or TCA have been extensively used to treat infestations of Johnson grass in small patches and have proved very satisfactory, but the chemicals sterilize the soil for 90 days or longer.

To control large areas or solidly infested fields, cultural methods are more practical than chemicals.

One recommended method is to remove the Johnson grass for hay in July when the first flowerheads appear and then plow the stubble and clean-cultivate every 2 weeks until late September when a small grain crop such as barley can be planted for combine harvesting the next summer. When the grain has been harvested plow the stubble and clean cultivate the land as was done the previous summer and seed small grain again for winter pasture and harvest. During two years much of the Johnson grass rootstocks and seeds can be destroyed provided wet summers do not occur. Johnson grass thrives in wet weather. But even then such a treatment often will control it so that cultivated crops can again be grown.

On heavily infested bottom lands eradication is so difficult that control instead of eradication is the most practical approach.

Johnson grass should under no conditions be sown for pasture or hay. Anyone sowing it is doing his neighbor a great disservice and should be told the damage he is causing.

Food for Thought

Will Rogers, invited to dinner by a friend, replied, "No thanks, I've already et."

"You should say 'have eaten'," his friend corrected.

"Well," drawled Rogers, "I know a lot of fellers who say 'have eaten' who ain't et!"

But fields that are heavily infested may be pastured to advantage or the grass may be used for hay or silage. Cattle or sheep should not be grazed on Johnson grass before it is 24 inches tall or after unfavorable growing conditions such as after drought, cold weather or frosts. Early growth or stunted plants are likely to cause prussic acid poisoning, as is true of sudan grass or other sorghums. It should be cut before the seed develops for hay or silage.

Urea Goes With Corn Silage

Adding urea to corn silage improves its feeding value, has other advantages . .

Condensed from
Ohio Farm and Home Research

Orville G. Bentley, E. W. Klosterman
and
Paul Engle

ADDING some form of protein supplement to a ration of corn silage has become standard practice for many beef cattle feeders. One such supplement tested recently at the Ohio Agricultural Experiment Station is urea — a simple, non-protein synthetic compound.

These tests indicated that it is feasible to add urea to chopped corn at the time of ensiling as a means of increasing the crude protein content of the mixture to be fed to fattening cattle. Problems investigated in connection with using urea as a corn silage additive were palatability, carotene loss and feed costs.

Urea is converted in the rumen to ammonia and carbon dioxide. The nitrogen is then in a form to be used by the rumen microflora for their growth. Eventually the rumen microorganisms and protozoa are killed as they pass through the small intestine and are digested like a common feedstuff. The non-protein nitrogen which has been incorporated into amino acids by the microflora then exists in a form which the animal can use itself.

We do know that use of non-protein nitrogen, such as urea, is promoted in the rumen by feeding high energy feeds like grains and molasses. With this fact in mind it seemed that corn silage — a high energy low protein feed — might be an ideal type of feed to consider for use with urea as a means of increasing its crude protein content.

If 20 pounds of urea is added per ton of freshly chopped corn, the concentration of urea and other non-protein compounds arising from urea in the silage is about one per cent. This means that the amount of non-protein nitrogen added is in keeping with long-standing recommendations on the levels of urea to be fed. As far as urea palatability is concerned, in 1954-1955 the silage actually contained only 0.4 per cent urea at the time it was

Reprinted from Ohio Farm and Home Research, Wooster, Ohio

fed to the steers or less than the one per cent level.

Apparently lactic acid and the short chain fatty acids combine with the ammonia released from the urea by the action of the enzyme, urease, to form a non-volatile salt. However, there was no problem with the odor from ammonia in 1952-1953 or 1954-1955. However, in 1953-1954 when 25 pounds per ton of urea was added, an objectionable odor was detected, especially when the silage was held in storage boxes after removal from silo. Even this silage appeared to be palatable to the steers as they ate as much of the urea silage as the untreated silage.

In addition to being palatable, any livestock feed must be digestible to the extent that it is converted satisfactorily to nutrient elements available to the animal. In the study the Station conducted a series of digestion studies with wethers. A common method for studying this procedure is to place the animal in a special metabolism crate. Here it is possible to accurately control and measure feed intake and at the same time analyze the excretions to determine the extent of digestion.

It is significant to note that according to the metabolism tests, corn-urea silage compared favorably with corn silage plus soybean oil meal. In other words, the apparent digestibility of the dry matter and nitrogen were quite the same for both types of feed. The cellulose digestibility appeared to be slightly lower for corn-urea silage.

During this study, the Station made only one test on the treated corn silage for the presence of carotene. Urea apparently did not affect its preservation. This point should perhaps be checked further since temperature, silage quality and packing may affect carotene loss.

It would appear from these tests that urea can be added to corn silage for fattening cattle to a level of up to 20 pounds per ton of silage when stored in upright silos. No other types of silos were used in these experiments.

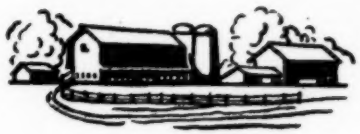
The Station is not able to recommend the addition of urea to meadow crop silage because no such experiments have been conducted. However, the addition of urea to meadow crop silage might be questioned, especially if the hay crop silage was made from a crop containing a lot of legumes. These are naturally high in crude protein.

At the present time, those who desire to mix urea with silage will probably find it difficult to obtain the product. Feed urea is now being sold only to those who have proper equipment for thoroughly mixing it with other feed ingredients.

Build Safety Into Your Farm Buildings

When you build or remodel, consider these ways to built-in accident prevention . . .

Condensed from
New Mexico Extension News



Mrs. Dorothy Y. Hanny

IF a farmhouse is well planned and constructed, it will have built-in safety features.

Here are some of the ways that you can build safety into a farmhouse or remove hazards:

● Be sure the porch and stair rails are sturdy. A weak rail is worse than none because it may give false confidence.

● See that the upper floor has more than one exit in case the main stairway should be blocked in an emergency. A second stairway is desirable; but if it cannot be provided, an emergency exit may be a window opening onto a flat or low pitched roof. The window should open easily, and a storm sash or screen should be a type that can be quickly removed.

● Select floor coverings for entry ways, kitchen, and bathroom that will not be slippery when wet. When waxing a floor, use a thin coat and rub it in well. Some waxes are non-skid. Provide grips or non-skid backing for small rugs. Install grab bars at a bathtub or shower stall.

● If the light in the bathroom is turned on by a pull chain instead of a wall switch, be sure the chain is nonmetallic or at least the lower end is nonconducting.

● Never turn a blow torch on a frozen pipe to thaw it. Built up steam and pressure may cause an explosion. Protect pipes against freezing by locating them on inside walls or by insulating them.

● Provide clear visibility where the farm driveway enters a public road. You should be able to see several hundred feet in each direction. Many farm entrances could be made safer by cleaning brush from a fence corner, or pruning projecting tree branches,

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or removing a hedge.

Steps and Stairs

Falls on steps and stairs are the chief causes of injuries in rural homes. These are pointers on stair safety — some to consider when building or remodeling, and some as improvements to make existing stairs safer:

● Steep stairs may save space, but they provide less secure footing. Good proportions for indoor steps are: Treads 10 inches deep plus 1 inch overhand; risers 7½ inches high. If space is not available, make treads 9 inches deep plus 1 inch overhand and risers 8 inches high. Good proportions for outdoor steps are: Treads 12 inches deep and risers 6 inches high. The steps of a stairway should be uniform, because people take stairs at an even pace by habit and an unexpectedly high or low step could cause a jar or a fall.

● Try to break a long flight of stairs with a landing. Choose a flat landing rather than the space-saving device of "winders" at the right-angle turn. Steps at such a turn are a hazard.

● For head protection on stairways, allow at least 7½ feet of space measured vertically from the front of the tread to the ceiling or other obstruction above.

● Attic stairs are often the steepest. If space is at a premium, a pull-down ladder may be safer than a very steep stair.

● Install a firm handrail along at least one side of a closed stair, and on both sides of an open stair. See that all stairways, indoors and out, are lighted from top to bottom. Indoors, a 2-way switch at both top and bottom of a stair is advised. If good lighting cannot be installed promptly on a dark stairway, temporary safety measures are to paint the top and bottom steps with a broad white stripe and to keep a flashlight at the top of the stairs.

Rising world population and improved levels of foreign economic activity, accompanied by rising incomes and better diets, all point to a favorable outlook for export of U. S. farm products, according to the U. S. Department of Agriculture. Some problems to be overcome in competition for world markets include: increased agricultural production in other countries, high prices for some U. S. products in comparison with prices offered by foreign producers, shortage of dollars in many countries, and international trade barriers.

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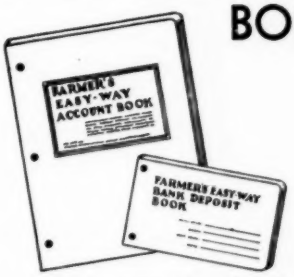

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As a farmer, you'll be pleased to learn that psychologists rate you high as an intelligent buyer. They recognize that the age old conflict between the "city slicker" and "hayseed" still exists and point out how to overcome it. In the competition for sales, successful firms understand the character, outlook and attitude of the modern farmer and base their sales appeals and methods accordingly, they say.

To l e a r n what farmers are really like, thousands of interviews were conducted. Here are the results greatly condensed and simplified. Check yourself against the list below:

1. The farmer works to minimize risk. He is at the mercy of so many uncertainties, he can't afford to gamble on things he can control. He counts heavily on his own experience. He watches his neighbor, wants to hear about his experiences. He keeps in touch and respects information from his agricultural college, county agent, and the U. S. D. A. He must see to believe, but . . .
2. He learns fast, is always ready to change. Unlike his city cousin, he isn't looking for the new just to be different. His own failures make him critical of his own methods. He still has to be convinced by demonstration, but he is willing to experiment and try the new . . . anything to better control his farming business.
3. He is patient, more philosophical. Fast benefits don't appeal to him as much as the city dweller. He doesn't like to be hurried. Fast talking salesmen proved to be at a disadvantage.
4. Reality, not appearance counts with him. He has learned to be a little suspicious. Things that don't look right, probably are not right. Things that look right, may not be right underneath.
5. He likes to grow, change and improve things. Especially he likes to work for himself. He gets pleasure from his work, does not look outside for hobby interests so much as the urbanite.
6. He thinks always about the future . . . plans what he will do next year and the year after. He wants to improve the farm, add new buildings, buy new equipment.
7. He is independent, wants his fate to depend on his own efforts. More than others, he resents and resists governmental orders and appeals. His farm is his own domain. He is his own master.